Three Essays on Child and Female Welfare in Indonesia

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Chapter 1

Introduction

An extensive literature generally agrees that early childhood development can have lasting impacts on adulthood outcomes (Grantham-McGregor et al., 2007; Santrock, 2004). Because skills are shaped by both genetic factors and choices, investments in the early years of childhood can be important determinants for adult outcomes (Helmers and Patnam, 2011; Lam and Duryea, 1999; Rosenzweig and Stark, 1997; Rosenzweig and Wolpin, 1994). In addition to this, child development research also shows that there are sensitive periods in a child's life when the development of skills is at its peak (Blau and Currie, 2006; Cunha and Heckman, 2007). This implies that gaps in human capital accumulation can occur at early ages.

In the context of developing countries, Grantham-McGregor et al. (2007) estimate that more than 200 million children in those countries failed to achieve their development potential because of socioeconomic causes, such as poverty and malnutrition. Thus, this failure in adequate childhood investments has consequences that reach far into the future for those countries, including intergenerational transmission of poverty. Given that households in developing countries are frequently subjected to various market and institutional failures, inadequate investments in children early in their lives can have more serious consequences for children in these countries. Therefore, understanding the factors that determine early childhood investments in developing countries is essential for improving the general welfare of the children in these countries. The goal of the essays in this Ph.D thesis is to contribute to increasing that understanding.

The first essay of this thesis examines the underlying factors that led to the small impacts of Indonesia's Conditional Cash Transfer (CCT) Program on child health outcomes. In mid-2007, the government of Indonesia launched a CCT program with the stated goal of improving early childhood investments in child health and education (World Bank, 2008). Although the program provided large cash transfers, amounting to 15 to 20 percent of a poor household's per capita income, the impact evaluation conducted by the World Bank (2011) shows little or no impact of the program on child health. Given the scale of the program, the lack of strong positive impacts raises questions about the efficacy of the program to influence the health outcomes of the beneficiary children. This study, thus, develops a theory of change to provide a framework for understanding the poor performance of the Indonesia's CCT program. In particular, this study uses the data collected to evaluate the program to test seven different hypotheses about the location of the weak link in the theory of change. This first essay thus differs from most of research on CCT programs, which typically focus on impact evaluation. This study instead uses the data to understand the process, instead of just the impacts.

The second essay estimates the impact of the 1997 East Asian Financial Crisis on the cognitive skills of children in Indonesia. The financial crisis had massive political, economic and social impacts on the Indonesian population. Among the Southeast Asian countries hit by the crisis, the impacts were most severe for the Indonesian economy (Furman et al., 1998). Previous research shows that the impacts of the crisis on child health outcomes were relatively moot (Block et al., 2004; Frankenberg et al., 1999; Strauss et al., 2004). However, none of these studies examines the impact of the crisis on child cognitive development. This second essay therefore attempts to estimate the impacts of exposure to the economic crisis during early childhood on children's cognitive development. This, to the author's knowledge has not been done for the case of Indonesia.

The third, and last, essay attempts to estimate the causal impacts of religiosity on female autonomy. This essay is motivated by studies that have shown positive impacts of female bargaining power within household on child outcomes (Adato et al., 2000; Beegle et al., 2001; Iyigun and Walsh, 2007). Connecting this to the first essay, this relationship between women's autonomy and child outcomes is one of the reasons why most CCT programs require that the transfers be collected by mothers. Thus, understanding what determines women's autonomy is important not only due to its direct benefit to the women, but also to its indirect benefit through the impacts on their children. Many studies have examined the determinants of female autonomy, including the relationship between religion and female autonomy (Chattopadhyay and Goswami, 2007; Heaton et al., 2005; Lundberg and Pollak, 2003; McElroy, 1990; Obermeyer, 1994). However, there are few studies that examine the relationship between religiosity, intensity of religious practice, and female autonomy. This essay will thus try to address this by employing the rich data from Indonesian Family Life Survey (IFLS) to estimate the causal impacts of religiosity on female autonomy.

Chapter 2

Understanding the Linkage between Indonesia's Conditional Cash Transfer Program and Child Health in Indonesia

2.1 Introduction

In the last two decades, conditional cash transfer (CCT) programs have come to the forefront of poverty mitigation policy in many developing countries. These programs grant poor households a specific amount of cash conditional on these households satisfying certain required health and education behaviors (usually involving child immunization, health check-ups and school attendance). Several studies have shown that CCT Programs can improve child health status and education outcomes (Parker et al., 2007). Following the apparent success of CCTs in other countries, in 2007 the Government of Indonesia joined the growing number of developing countries that have adopted such programs. Surprisingly, the initial impact assessment of the Indonesian pilot CCT program shows relatively small impacts on both health and education outcomes (World Bank, 2011). That evaluation suggests several possible reasons for these results, such as the low quality of health facilities and the small amount of the transfers. Nevertheless, despite these disappointing impacts, the Government of Indonesia continues to expand the program throughout the whole country, as seen in Table 2.1

There are several possible reasons why a CCT program could have disappointingly small impacts on children's health outcomes. First, the program might be reinforcing a behavior that was already part of most households' behavioral decisions. Second, the cash transfer amount may not be enough to induce more investment in basic health care. Third, the supply of health services in the program areas may not be sufficient. Fourth, the required health behaviors imposed by the programs may by themselves have very little effect on child health. Fifth, households may allocate the cash transfer or reallocate other expenditures in such a way that diverts most of the benefit away from the beneficiary children. Sixth, lack of enforcement of the health behaviors required to receive the cash transfers may reduce the program's impact on children's health outcomes. And seventh, the child health outcomes maybe less affected by the transfer because it is often not collected by the mothers.

This study will investigate the plausibility of these seven different hypotheses, all of which attempt to explain the disappointing results of Indonesia's CCT Program on child health. In contrast to the existing extensive literature on CCTs, most of which is limited to estimating the overall impact of the program, this study will concentrate in trying to understand the causal chains behind the disappointing performance of the Indonesian CCT program. This focus can provide some useful suggestions to improve both the current program as well as similar future programs. This research is particularly relevant for a country such as Indonesia, where CCT programs are being implemented as an important tool to reduce the poverty rate, which is currently at 11.2 percent.[1]

[1] The Statistics Indonesia estimates that in 2015 there are more than 28 million Indonesians

The rest of this study is organized as follows. The next section reviews the existing literature on both intra-household allocation of child health investments and CCT programs. This is followed by a brief historical examination of Indonesia's public welfare policy, focusing on health programs, to provide the context for the implementation of the CCT program. The next section describes the Indonesian CCT Program, and the results of the initial impact evaluation that was conducted by The World Bank. This is followed by a description of the identification strategy used for the empirical estimation. The last two sections report the findings and summarize the findings of the research.

2.2 Literature Review

Human capital accumulation has been a subject of research in economics since the early 1960s. The development of health economics as a distinct sub-discipline within economics is due to the work of Arrow (1963) on the subject of medical care. This sub-discipline has also benefited from the work of Schultz (1960, 1961) and Becker (1964) on human capital theory, which has been used for various applications beyond those studies' initial focus on education. Since the publication of these seminal works the study of health issues by economists has progressed significantly.

However, as in many areas of empirical economics, a persistent theme in health economics is the difficulty of establishing causality using observational (e.g. survey) data (Strauss and Thomas, 1998). This is because health outcomes are frequently interrelated with other types of human capital, such as the intricate relationship between health status and both school performance and labor

who live below the official poverty line.

productivity (Fuchs, 1996, 2004; Glewwe et al., 2001; Miguel and Kremer, 2004). Furthermore, human capital is also related to other unobservable factors such as genetic endowments, parental preferences and the social environment (e.g. tacit norms and rules). The relationships between these observable and unobservable factors are oftentimes difficult to tease out to determine the direction of causality. These difficulties are part of the reason for the flourishing use of the randomized control trial (RCT) methodology to evaluate the impact of government social welfare policies. One such policy that is related to child health and education is the popular CCT programs that were initially started in Mexico and Brazil, under the names *PROGRESA* and *Bolsa Familia*, respectively.

On top of its importance to children's lifelong well being, child health is particularly important because currently around 6.3 million children under five die every year (UNICEF, 2014), 50 percent of whom died due to infectious disease. The issue of child health is even more critical for developing countries, where child health problems persist despite improvements in the developing countries' economies (Black et al., 2008). As a developing country, Indonesia faces several problems regarding child health investments and outcomes. Furthermore, although the maternal and infant mortality rates have continued to fall in Indonesia, they are still high compared to other East Asia and Pacific (EAP) countries (World Bank, 2012). Indonesia also faces problems of disparities in the accessibility of health services between regions and across socioeconomic groups. Thus, it is no surprise that the Government of Indonesia decided to implement a CCT program that provides cash transfers and incentives for human capital investment in both health and education simultaneously.

Another appeal of CCT programs in terms of their health behavior requirements is due to research that has shown that there is a critical and sensitive period in children's development that influences their development later in life. This hypothesis has been supported by many research studies. For example, a study by Knudsen et al. (2006) showed that some skills are more productively acquired at a certain period of childhood. One example is the ability to learn a second language, which will be higher if the child started at an early age (Newport, 1990). This implies that inequality of cognitive and non-cognitive skills across socioeconomic groups starts in early childhood (Blau and Currie, 2006; Cunha and Heckman, 2007; Heckman and Carneiro, 2003). Thus, another appeal of CCT programs is that they are targeted to young children in poor households, which the research on early childhood development suggests is the most effective approach to increase children's human capital.

Thus, although the initial endowment (e.g. genetic and family traits) of children is an important determinant of their skills, disadvantaged groups in society may improve these conditions through external support (from either the government or their communities) to help them close the gap in child development. In developing countries, where various market and institutional failures (e.g. credit constraints and weak infrastructure) are common, the need for external support, especially from the government, is more pronounced. Without public investment in child health, households' investments in child health will be prone to various arrays of shocks that frequently befall poor households. This might further widen the gap of child development between poor households and their wealthier counterparts. Given this context, CCT programs may be able to influence households' decisions on child health investments, both directly through the conditionality requirements and indirectly through the expansion of households' budget constraint brought about by the cash transfer.

Ever since they were first launched in Mexico and Brazil in the 1990s, CCTs have become one of the main policies in many developing countries to reduce poverty. Such programs are designed to respond to the immediate needs of the poorest segments of communities by increasing their incomes. Even more ambitiously, the main goal of CCT programs is to break the inter-generational cycle of poverty by increasing investments in human capital accumulation among the poor at a very young age.

The evaluations of the CCT program in Mexico, and of its subsequent replications in other countries, have shown generally promising results on child education and health outcomes. For example, a study by Gertler (2004) finds significant child health improvements due to Mexico's PROGRESA CCT program on three measures of child health: child morbidity, height for age, and anemia. Evaluations of the same type of programs in other countries have shown similar results, such as studies by Behrman and Hoddinott (2005); Leroy et al. (2008); Rivera et al. (2004) for Mexico; Maluccio and Flores (2005) for Nicaragua; and Attanasio et al. (2005) for Colombia. However, not all CCT programs record positive impacts on child health outcomes. No impacts on child anthropometry were found in Honduras (Leroy et al., 2009) or Brazil (Morris et al., 2004). The results in Honduras was argued to be caused by the small size of cash transfer (4 percent of household expenditure); while the results in Brazil is suspected to be due to mistaken perception that households would no longer be eligible for the program if their children's growth shared no signs of malnutrition.

Aside from the child health outcomes, some of these studies along with several other studies, also examine the pathways of which the programs can impacts the child health outcomes with mix results. For example, a study by Morris et al. (2004) shows that the CCT program in Honduras has increased child visits to health center and getting DPT1 vaccine. The research, however, also shows that the program has no significant impacts on measles vaccination. Research by Attanasio et al. (2005) on Colombia also shows strong positive impacts of that program on children's health care visits and on younger children's (less than 24 months) DPT1 vaccination rate, but no significant effects on the vaccination rates for older children.

Given that the evaluations of the CCT programs in other countries have shown that such programs often improve child health, the relatively mediocre health impacts found in the Indonesian PKH Pilot program should raise several concerns about the quality of the program and its overall efficacy for improving child health. In addition, CCT programs have been the subject of various criticisms, such as the high implementation costs, the paternalistic nature of the program, and unknown mechanisms behind the results (Baird et al., 2011; De Janvry and Sadoulet, 2006). Given these reasons for caution, there is a need for a formal examination to understand the reasons behind the disappointing results of the Indonesian CCT program. This is particularly important because the Government of Indonesia has, since the initial pilot, expanded its CCT program to the rest of Indonesia.

This study will examine the underlying factors that drive the unexpectedly small health impacts of Indonesia's CCT program by testing seven possible hypotheses. The first hypothesis proposes that the health behaviors required by the program were already being practiced by the vast majority of households. The second hypothesis is that the amount of cash transfer given is not enough to induce behavioral change in child health investments. The third hypothesis posits that the supply of health services in the program's area may be insufficient to improve children's health conditions. The fourth hypothesis proposes that the health behavior requirements imposed by the program may not have large impacts on child health. The fifth hypothesis is that parents of beneficiary households may reallocate their expenditure in such a way that the transfer does not benefit beneficiary children. And the sixth hypothesis posits that weak enforcement of required health behaviors results in little change in health behaviors and thus to small impacts on health. And lastly, the child health outcomes maybe less impacted by the transfer because it is often not collected by mothers. Note that these hypotheses are not mutually exclusive, as it is possible for two or more to be correct simultaneously.

This study differs from much of the existing literature because of its focus on trying to understand the underlying mechanism of the program instead of simply evaluating the impact of the program. Most past research on CCT programs focuses on the impacts of the programs on various welfare outcomes, such as child health, education, mental health and even community participation. This research instead tries to unpack the causal chains behind the Indonesian CCT program. Only a few studies have tried to examine the causal chains of CCT program (Gaarder et al., 2010; Leroy et al., 2009). However, most of these studies are qualitative in nature. Thus, this study, in addition to examining the reasons behind the relatively small impacts of the program, is also conducted to demonstrate how the data that were collected to estimate the impacts of a program can also be used to understand the mechanism by which the program worked or failed to work.

2.3 A Brief History of Indonesia's Public Health Policies

The origins of the current national health care system in Indonesia started as early as 1949, just three years after Indonesia obtained independence from more than three centuries of Dutch colonial rule. In that year, the government implemented a pension program for civil servants. In 1963, the government added to this benefit by providing health insurance for civil servants. During the 1960s, this health insurance covered mostly government workers, with only minimally coverage for other formal sector workers (Aspinall, 2014).

The 1965 coup by General Suharto brought about a regime change that shifted the focus of Indonesia's economic policies. In the early years of his presidency, Suharto was advised by a group of economic advisers (famously called the "Berkeley Mafia") who urged him to focus more on economic development. In 1968, the government implemented a new system of community level health centers (*puskesmas*) that provided health services at a low price. Within twenty years, the government managed to achieve full national coverage, with one center for every 30,000 people. Furthermore, in the 1970s, the government initiated a wide-reaching effort to broaden the reach of its social welfare policies. Taking advantage of the oil boom windfalls in the 1970s, the Indonesian government implemented massive construction of education and health care infrastructure. One such program was a nation-wide family planning program, which included: a comprehensive program of targeted advertisements in national and local media; development of community health centers; and outreach to local and national religious figures.

Although the infant mortality rate, life expectancy and other health indicators improved, the quality of health care at community health centers and other government-run health facilities was frequently poor due to limited funding for training of staff and for provision of medical equipment. The quality of health services became so low that financially able government employees often opted to pay for medical services from private health care facilities, or even from abroad. This created a two-tiered system in which the rich received the best health care, while the poor were consigned to the public health care system, which in effect provided only basic health care. One indicator of this disparity is from a study conducted in 1995, which concluded that the richest 10 percent of the population was 10 times more likely to be hospitalized than the poorest 10 percent of the population (Kristiansen and Santoso, 2006).

In 1992, the government consolidated the existing health insurance systems spread accross different government agencies into one centralized insurance system, called Jamsostek (*Jaminan Sosial Tenaga Kerja* - Social Security Scheme). The program provided various insurance schemes, such as occupational injury insurance, health insurance and life insurance, for workers in the formal sector. Towards the end of Suharto era, the program experienced rampant noncompliance on the part of many employers, so that only about one third of formal workers were covered by the system in 2003 (Thabrany, 2011).

In 1998, Suharto resigned from the presidency due to the economic collapse and social unrest that arose from the 1997 Asian Financial Crisis. The crisis increased the national poverty rate from 15 percent in mid-1997 to 33 percent by the end of 1998 (Sumarto et al., 2008). To address this severe economic downturn, the transitional government launched a major social safety net program, called JPS (*Jaringan Pengaman Sosial* - Social Protection Safety Net). Unlike the

Jamsostek, JPS was created with a specific aim to protect the chronic poor from the crisis and to reduce their vulnerability to risk. The program included various initiatives on education, health, employment and food security. The health component covered a wide range of health care services, from subsidies for medical equipment provision to free family planning services (Sumarto et al., 2010). Although the scale of the program eclipsed any previous social welfare program (Sumarto et al., 2008), rampant leakages due to inadequate targeting and corruption led to severe criticisms from the population (World Bank, 2008).

In 2003, under President Megawati Soekarnoputri's leadership, a free health care initiative with wider coverage was introduced. The new program was built directly on the existing JPS program. Unlike the JPS, however, this program was managed at the district level; which allowed more involvement of local governments in the national program. Yet, in 2004, the new President, Susilo Bambang Yudhoyono, re-centralized the health insurance system under the name Askeskin (*Asuransi Kesehatan untuk Masyarakat Miskin* - Health Insurance for the Poor) which provides health insurance mainly for the poor. This program was later called Jamkesmas (*Jaminan Kesehatan Masyarakat* - Community Health Insurance).

Despite the name change, the basis of the protection scheme was still the same. The program was still targeted towards the poor population, even though it still retained its initial flavor in that it included insurance for workers in the public and formal private sectors. The main difference is that the formal workers had to pay an insurance contribution, while the poor was fully funded by government fund (Sparrow et al., 2013). Although the new program managed to improve the targeting and coverage, the low utilization rates among beneficiaries of the program still persisted (Sumarto et al., 2010).

On top of the central health insurance system, the decentralization that began in 1998 has also enabled some local governments to initiate a local health insurance schemes targeted towards their local constituencies. One such example was the famous initiative created by the *Bupati* (head of district) of Jembrana District in Bali (Rosser et al., 2011), who provided universal health care for the residents of Jembrana District funded by the district budget.[2] Such local health initiatives have spread to other wealthy districts in various provinces. Unlike the national program, access to health services required proof of residence and was usually limited to local public health facilities. As many districts could not afford to adopt such health care programs, the national health policy remained important for those districts.

The national social welfare programs, including the health insurance system, were alleged to have poor targeting by citizens and the media. The media and public criticism became very severe when the government launched an *unconditional* cash transfer program (*Bantuan Langsung Tunai* -BLT) in 2005, which was initially intended to compensate poor and near poor citizens from the impact of the government's decision to reduce subsidies on gasoline, diesel and kerosene. The BLT program was accused by the media of having chronic inefficiencies and leakages in its targeting. Although no rigorous research has provided evidence corroborating these allegations, the government nevertheless decided to focus on improving its beneficiary targeting methodology for their subsequent social welfare programs, which includes the household CCT program (*Program Kelu-*

[2] The district budget consists of the district's own revenue (*Pendapatan Asli Daerah*) and an equality grant (*Dana Perimbangan*) allocated by the national government.

arga Harapan - PKH) and community CCT program (PNPM *Generasi*). Both programs included major health components and involved intensive efforts to improve their targeting quality and distribution systems. Note that, as of January 2014, the Government of Indonesia decided to implement a universal healthcare program called *Jaminan Kesehatan Nasional* (JKN). This new program unified various national insurance programs under a new social security agency, *Badan Penyelenggara Jaminan Sosial Kesehatan* or BPJS (The Economist, 2015). Despite the implementation of the universal healthcare, the Government of Indonesia did not abolish its CCT program, which is still running even today. However, because the pilot for the CCT program, which is the focus of this study, was implemented before this universal healthcare program started, it needs to be understood within the context of the previously fragmented public healthcare system in Indonesia.

2.4 The Indonesian CCT Program and Data

Despite generally robust economic growth in the last four decades,[3] the provision, and outcomes, of health care and education services in Indonesia are still low compared to its neighboring countries (World Bank, 2011). To address this issue, and motivated by the reported successes of CCT programs on investments in the human capital of young children in other developing countries, the Government of Indonesia decided in 2007 to launch a CCT program in Indonesia.

Indonesia's CCT program consists of two parallel but independent programs, the community CCT program (PNPM *Generasi*) and the household CCT pro-

[3]Since 2002, Indonesia's GDP growth per capita has been between 3 to 4 percent annually. During the height of the economic boom from the 1970s to the first half of 90s, the average annual per capita growth rate was around 6 percent annually.

gram (*Program Keluarga Harapan* - PKH). Although both programs were created to generate investments in health and education, the programs differ in terms of design, implementation and executing agency.

The PNPM *Generasi* program is an extension of the government's sub-district infrastructure development program, the *Kecamatan* Development Program (KDP), which was implemented to improve infrastructure in underdeveloped sub-districts. Building on the KDP, the PNPM *Generasi*program provides a block grant to communities conditional on their commitment to health and education investments. The type of health and education investments are decided communally and can include investments such as procurement of health equipment for integrated health posts to contracting additional teachers for local schools.

In contrast to the PNPM *Generasi* program, the PKH program is targeted to provide cash transfers directly to poor households. The program was designed to substitute for the heavily criticized Unconditional Cash Transfer program (BLT) that was launched by the Government of Indonesia in 2005. Similar to other countries' CCT programs, the PKH's cash transfers to poor households are conditional on utilization of health and education services. Thus, the PNPM *Generasi* program and the PKH program can be considered to be separate but complementary programs, where the PNPM *Generasi* addresses the supply side, and the PKH addresses the demand side, of health and education services. In addition to these differences, the government agencies executing the two programs are also different. The Ministry of Home Affairs (MOHA) is responsible for implementing the PNPM *Generasi* program, whereas the Ministry of Social Affairs (MOSA) is responsible for implementing the PKH program.

The pilots for both CCT programs were conducted in the second half of 2007 in the same six provinces and in the Special Capital City District of Jakarta (*Daerah Khusus Ibukota* (DKI) Jakarta). Initially, the pilots covered five provinces (West Java, East Java, North Sulawesi, Gorontalo and East Nusa Tenggara (NTT)), but soon after West Sumatra and DKI Jakarta were added. These provinces were selected due to their local government's willingness to participate in the program and because they represent Indonesia's diversity. Although both programs were piloted at the same period and in the same provinces, each program targets different villages because of differences in implementation focus.[4] Given that this research is concerned with the PKH program, the following sub-sections will focus on that program.

2.4.1 The PKH Program

Similar to CCT programs in other countries, the cash transfers of the PKH program were given to the children's mothers in the treatment communities. The Indonesian Post Office is responsible for distributing these transfers due to its wide coverage. There are no specific rules that households are expected to follow regarding the use of the cash transfers. The amount of the transfer is around 15 to 20 percent of poor households' per capita consumption and is disbursed quarterly. The exact amount of the cash transfer differs according to the type and age of the person it is intended to benefit, as shown in Table 2.2. The table shows that the amount (per year) for health component beneficiaries, who are children age 0-5 years old, and pregnant or lactating mothers, does not depend on the number of individuals eligible for the health component in the household.

[4] Although conducted simultaneously, the two programs are conducted in different districts, and the subsequent randomization procedures to select the treatment and control groups were conducted separately for each program. Thus there was no overlap of implementation area (in terms of either treatment or control group) between the two programs.

For example, a household with two children age 0-5 will receive the same amount per year as a household with one child age 0-5 years old, namely IDR *(Indonesian Rupiah)* 800,000.

In contrast, the amount for education component beneficiaries, children age 6-15 and children age 16-18 who have not finished grade 9, applies individually. For example, a mother who has three primary aged children (6-12 years) attending school will receive IDR 1,200,000, that is IDR 400,000 per child per year (plus the base amount of IDR 200,000 per year for a total of IDR 1,400,000). However, there is a maximum amount of transfer per household: IDR 2,200,000 per year. Thus for households, the transfers can range from a value of Rp 600,000 to Rp 2.2 million annually, with the exact amount depending on the age of the children and on the presence of a pregnant or lactating woman.

Health behaviors are required of pregnant women, lactating women and children age 0-5 years old to receive the cash transfers. The required health behaviors are as follows. Pregnant women must complete four antenatal care visits, take iron tablets during their pregnancy, and have a professionally assisted birth (by a doctor, a nurse or a medically trained midwife). Lactating mothers must complete two postnatal care visits. Children aged 0 - 5 years old must complete all childhood immunizations, take vitamin A capsules twice per year and participate in growth monitoring: monthly for infants 0 - 11 months old and quarterly for children aged 1-5 years old.

Education conditionality applies to households with children aged 6 - 15 years (or children aged 16-18 years who have not yet completed grade 9). The education conditionality requirements are: enrollment in school and a minimum 85 percent attendance rate for children age 6-15 years old; or enrollment, though no minimum required attendance, in a school or a basic equivalent education program for children aged 16-18 years old who have not finished grade 9.[5]

The local administrators of the programs are the PKH administrator and PKH facilitators, the latter of whom were responsible for daily management of the program and for providing information to the beneficiaries, in particular on the importance of conditionality fulfillment and the consequences of failing to fulfill the conditionality. The enforcement rule is stated as follows. The first time that conditionality is not met, the beneficiaries households will receive a warning letter from a PKH facilitator. The second breach results in a 10 percent reduction of the transfer. After the third breach, the beneficiaries households are permanently expelled from the program. The verification process relies on health and education service providers, who are expected to input compliance verification data online before the initiation of payments.

2.4.2 The Design of the PKH Evaluation

To conduct impact evaluations of both the PNPM *Generasi* and the PKH programs during the pilot phase, the Government of Indonesia implemented a Randomized Controlled Trial (RCT). The first step was to exclude from both programs the richest 20 percent of districts in each of the seven pilot provinces.[6] From the remaining 80 percent of districts in each province, only districts that were not eligible for the PNPM *Generasi,* i.e. non-KDP districts, in these seven

[5]The basic equivalency education program (the Equivalent Primary-*Paket A* and Lower Secondary Schools-*Paket B* Program) is a non-formal education system provided by the Government of Indonesia for children older than 15 years old or adults who have not completed grade 9. The students can then participate in primary and lower secondary school equivalency exams that will allow them to continue their education further to either lower secondary or upper secondary school, respectively.

[6]The criteria used were poverty rates, incidence of malnutrition and the transition rate from primary to secondary school.

provinces were considered for the PKH program. This left 49 districts to be considered for the PKH program.

In the 49 districts where the PKH pilot program was implemented, only some households were eligible for the program. The selection process for PKH eligible households in these 49 districts and cities consisted of two steps: (1) selection of PKH sub-districts; and (2) selection of eligible households in the selected PKH sub-districts. Within the 49 districts, sub-districts that were considered "supply side ready"[7] were randomly assigned into a treatment group and a control group. This selection process resulted in a total of 588 supply-side ready sub-districts, of which 329 randomly assigned to the treatment group and the other 259 were randomly assigned to the control group. Figure 2.1 summarizes the randomization process of the pilot PKH program.

The selection of CCT eligible households from these 588 PKH-eligible sub-districts also consisted of several steps. First, an initial roster of potential CCT beneficiaries was developed by Statistics Indonesia by conducting a survey of the poor and extremely poor households from the beneficiaries list of the 2005 UCT program from the list of households that was already collected by Statistics Indonesia (BPS) in 2005.[8] This initial screening excluded around 30-40 percent

[7]Supply-side readiness was determined by a statistical analysis of the available health and education facilities in the sub-districts. The threshold for sub-district in non-Java provinces was set to be lower to ensure greater inclusion of areas outside of Java, despite their relatively limited supply of health and education facilities. The data used were Village Potential (PODES) 2005 data.

[8]The 2005 UCT program provided cash transfers, with no conditionality requirements, for all poor and near poor households to compensate for the reduction in national subsidies for gasoline. The Government of Indonesia classifies the poor or near poor households based on survey data that Statistics Indonesia collected specifically for the UCT program. Statistics Indonesia used 14 criteria based on households' characteristics and assets, examples are households whose assets were valued at less than IDR 500,000 (equivalent to USD 38), and household head's education was less than lower secondary.

of the UCT beneficiaries who were classified as near poor. During the survey process, Statistics Indonesia also expanded the screening process in the PKH targeted area to identify additional poor households that might have been excluded from the initial 2005 UCT beneficiaries list. This exercise increased the number of households on the initial list by around 5 percent. A proxy-means test (PMT) was then applied to all the households on this augmented UCT beneficiaries list to identify the extremely poor households[9] for the preliminary CCT roster.[10]

These extremely poor households were then further screened to identify eligible households based on the program criteria: households with pregnant/lactating women and/or with children aged 0-15 years or with children aged between 16-18 years who have not yet finished 9 years of compulsory basic education. Statistics Indonesia then gave this list to the implementing agency, the PKH Implementation Unit (UPPKH) established at MOSA, for final approval of the beneficiary list. Originally the program was intended to include only extremely poor households. However, due to additional funding availability, a small percentage of households that are poor but not extremely poor from the preliminary CCT roster were added back into the final household CCT roster. These additional households were chosen from those poor households that were close to the bottom end of the consumption distribution based on the criteria used in the proxy mean test. In the end, around 430,000 eligible households were identified as eligible

[9] Statistics Indonesia defined households as extremely poor if they used a large portion of their income for basic staple foods; could afford medical treatment only at public health facilities; cannot buy clothing once per year; could not afford to send the children to school or could only afford children's schooling up to lower secondary school.

[10] The PMT was based on 29 variables, including housing characteristics, education attainment, fuel sources, type of employment and access to health and education services.

for the CCT program in these 588 sub-districts of the seven pilot provinces, DKI Jakarta, West Java, East Java, West Sumatra, North Sulawesi, Gorontalo and NTT.

2.4.3 PKH Program Survey Design and Data

To conduct an evaluation based on the RCT, a baseline survey was conducted between June and August of 2007, before the first PKH transfers were distributed. The survey randomly sampled households in both PKH treatment sub-districts and control sub-districts. The first stage of the sampling plan for the baseline survey was to sample eight villages/urban precincts from each of the 588 sub-districts. In the second stage, one ward was randomly selected from each village/urban precinct in the sample. Lastly, in the third stage, five households were sampled from each ward.

The baseline survey covered six of the seven PKH provinces (excluding West Sumatra), and thus covered only 44 of the 49 districts included in the PKH pilot. From these 44 districts, baseline survey data were collected from 180 randomly selected PKH treatment sub-districts and 180 randomly selected control sub-districts, resulting in a sample of 360 sub-districts for the PKH evaluation. This selection of 180 sub-districts from the treatment sub-districts and control sub-districts was stratified by the urban/rural classification of the sub-districts.[11]

Due to concern that random sampling of households would have yielded a small number of treated households in the sample in the areas where program coverage was small relative to the population size, the sampling strategy used in

[11] A sub-district is defined as rural if the share of urban precincts is less than 30 percent of all precincts and villages in the sub-districts, according to the Village Potential 2005 survey data.

the baseline data collection was limited to households that were most likely to be PKH-eligible. This was done by limiting the sample to UCT eligible households. In addition, since many participants of UCT program were non-poor due to leakage of that program, a proxy means test was used to restrict the sample further to the poorer households on the UCT household list. This implies that the PKH sample is poorer than the general population in the PKH areas.

Sampling was considered only for villages with at least five UCT eligible households per ward in PKH sub-districts. Because some sub-districts have less than 8 villages that fulfill this criterion (five UCT eligible households per ward per village), additional wards from the remaining villages in these sub-districts were randomly selected to be added to the sample. This was done to ensure the same number of sampled wards per sub-district.[12]

Lastly, within each ward, the UCT eligible households with a sufficiently low proxy means test were classified into three groups: (1) households with pregnant/lactating mothers or married women who were pregnant in the last two years; (2) households with children age 6-15 years; and (3) remaining households. Then from each ward, five households were randomly selected from group (1) and group (2) only: two from group (1) and three from group (2).[13] This sampling method resulted in 14,326 surveyed households (7195 treated and 7131 control). The non-response rate was very low, below one percent, for individual

[12]The World Bank report points out that "Only villages with at least 5 UCT eligible HH/ward were considered for sampling. Thus, it's possible that less than 8 villages were sampled for some sub-districts. In this case, additional wards would be randomly selected from the remaining villages, as to balance the number of sampled wards" (World Bank, 2008).

[13]The World Bank report does not specify a category for households that have both pregnant woman and children aged 6-15 years old, as stated in the report: "Among the UCT eligible households, five households were randomly selected from groups (i) and (ii) only: two from group (i) and three from group (ii)" (World Bank, 2008).

household members. Figure 2.2 describes the PKH baseline sample selection.

In addition to the household survey, Statistics Indonesia also conducted a village/sub-district level survey of village characteristics and of health and education providers.[14] For the village questionnaire, in each village a village official (either village head, secretary or section head) was interviewed to collect information on various socioeconomic characteristics of the village. Two different health providers, community health centers *(Puskesmas)* and midwives, were surveyed to collect the data on health services quantity and quality in the PKH program areas.[15] For the *Puskesmas* survey, from each sub-district in the PKH program area one *Puskesmas* was randomly selected from all *Puskesmases* in each sub-district. If there was no *Puskesmas* in the sub-district, the *Puskesmas* in the neighboring sub-district whose working area includes the sub-district without a *Puskesmas* was selected instead. The midwives sample was drawn based on two sources in each sub-district: a list of midwives working for *Puskesmas* who also had a private practice and a list of private midwives. For each sub-district, two midwives from the first list and two from the second list were randomly sampled.

These same households, villages and health facilities were re-interviewed in

[14]The PKH survey has 8 questionnaires in the baseline survey and 9 questionnaires in the follow-up survey. The first four questionnaires cover individual and household characteristics. The last four or five questionnaires cover non-household characteristics. In the follow-up survey, aside from the original two questionnaires on health providers, another questionnaire on integrated health post *(Posyandu)*'s cadre/volunteer characteristics was added.

[15]Indonesia has two important types of government run local health facilities: community health centers (*Puskesmas*) and integrated health posts (*Posyandu*). The two facilities have the following differences. First, a *Puskesmas*'s coverage area is a sub-district (Note: a sub-district can have more than one Puskesmas), while a *Posyandu*'s is a village. Second, *Puskesmas* usually has a fixed physical office and work hours, while *Posyandus* do not necessarily have either. Third, the services provided by *Posyandu*s are more limited than those provided by a *Puskesmas*. Despite the differences, the two health providers are closely linked because it is the local *Puskesmas* that usually provides the medical staff and supplies for various *Posyandu*s in the sub-district. Within the context of CCT program, households are considered to have fulfilled the child health conditionality as long as they use the services from the local *Posyandu*.

a follow-up survey conducted in 2009, using respondent lists to locate baseline households, village officials and health care providers. These follow-up surveys were administered using a modified version of the baseline questionnaire. The attrition rate was relatively low, below one percent for individual household members and *Puskesmas* and around 2.8 percent for midwives.

The baseline and follow-up surveys were conducted by the University of Gadjah Mada (UGM), which is independent of the program implementation agency. The baseline survey was conducted between June and August of 2007, and the follow-up survey was conducted between October and December of 2009. This means that the follow-up survey was conducted around 26 - 30 months after the PKH baseline survey. Figure 2.3 provides the timeline of the surveys and program implementation, and Table 2.3 provides the baseline survey sample size.

Unfortunately, the implementation of the PKH program did not always follow the randomized assignment. Due to delays in transfers and expansion of the program in the middle of the pilot implementation, some sub-districts did not comply with their initial randomized assignment. Therefore, in addition to the two waves of the PKH household survey, this study also uses an additional data set on PKH program implementation status which provides information about sub-districts' initial randomization status and any changes to this status during the pilot implementation period. This additional data set provides information only on which treatment and control areas followed their initial randomized assignment, which treatment areas experienced delayed transfers, and which control areas received the treatment during the pilot implementation.[16] The data do not

[16]Aside from the CCT and the implementation status data, the World Bank also used additional administrative data from the Ministry of Social Affairs (MOSA) that are not publicly available for their impact evaluation report. This additional data provided a more accurate

provide information on the timing of the delayed transfer in the treatment area or the timing of transfers that were provided to some households in the control area even though they should not have received transfers. It is also unclear whether all eligible households or *only some* households received transfers in these control sub-districts that received transfers in contrary to their initial randomized assignment. Table 2.4 provides information on actual implementation, using baseline survey, follow-up survey, and administrative data. The table shows that about 3 percent of sub-districts (6 out of 180 sub-districts) in the treatment groups experienced a delay in the cash transfer and more than one fifth of sub-districts (39 out of 180 sub-districts) in the control groups received the cash transfers.

To address this issue in the empirical estimation for this study, the control sub-districts that received treatment during pilot will be assigned their status at baseline. Furthermore, Instrumental Variable (IV) estimation will be used to correct for possible bias due to some sub-districts not following their random assignment. Note that Table 2.4 includes only the sample distribution of children age 0-3 years old at the baseline. The follow-up survey also includes new households that were not surveyed at the baseline, these households constitute 2.4 percent of the total households in the sample. Lastly, only panel households will be used in the estimation for this study. The non-panel households constitute only around 4.2 percent of all surveyed households, thus excluding them should have little effect on the estimation.

record of transfers received by the households. Around 560 survey households, about 4 percent of all survey households, reported that they did not receive any PKH transfers even though the MOSA's data showed that they were consistently paid during the pilot period of the PKH program.

2.4.4 Quality of PKH Pilot Implementation

During and after the implementation of the PKH pilot, several studies were conducted to assess the quality of the program implementation. Two studies, one conducted by the Center for Health Research (2010) and the other by the SMERU Research Institute (Febriany et al., 2011), provide the most comprehensive operational assessment of the program in terms of study coverage and depth. The Center for Health Research conducted random checks on program implementation in nine districts across the seven PKH provinces between October, 2009 and February, 2010, while SMERU provided a qualitative assessment of the programs performance in two of PKH pilot provinces, West Java and East Nusa Tenggara between January to August 2010. Thus, these two studies provide a general picture of the operational challenges faced during the implementation of the PKH program.

The Center for Health Research study found that PKH program outreach was directed only to the beneficiary households, so that many village officials and service providers (who were supposedly responsible for conditionality compliance verification) were unaware of the existence of the program, although the study did not specify how often this occurred. Another potential problem was that many PKH program administrators were found to have a limited understanding about the program, and thus were unable to provide clear information about the mechanisms and goals of the program to the beneficiaries and other stakeholders, such as the village heads or midwives. This has caused many beneficiaries and these stakeholders to perceive the PKH program as an *unconditional* cash transfer program. The study by SMERU also found a lack of awareness and understanding on the part of local administrators and service providers. For example, all midwives in the five treatment areas interviewed by the study complained that they were not involved in or had no knowledge of the PKH program.

Aside from public outreach, the management information system (MIS) to verify the program's conditionality compliance was not fully functioning throughout the whole PKH pilot period (World Bank, 2011). This was due to several different problems, such as: 1. Unavailability and ambiguity of verification forms; 2. Lack of adequate local human resources at the local post office (which is responsible for transfer distribution), the service provider facilities (school and health facilities) and the local UPPKH offices; and 3. Failure to enter information from the forms into the MIS. Due to these problems, in the first two years of program implementation, verification of eligibility for conditional benefits was generally not functioning. Therefore, only a few, if any, households were subjected to penalties for non-compliance with the conditions stipulated by the program. The SMERU study shows that compliance with the required health behaviors by the beneficiaries was strongly affected by the active role of PKH facilitators in providing public outreach and monitoring. For example, in two treatment villages in NTT, the facilitators threatened to cut the PKH funding of the beneficiaries who were not fulfilling the health requirements.

The research by SMERU also notes that the CCT transfers amount may not be large enough to induce the behaviors required of the households by the program. For example, the cost of a birth assisted by a midwife ranges from IDR 150,000 to 800,000, which for the most expensive midwives is almost as high as the minimum annual transfers that can be received by households (around IDR 1,000,000). Table 2.5 describes the actual disbursements made by Government of Indonesia over the course of the pilot implementation (2007-2009), including the average payment per year that a household received. The numbers provided by the table seem to corroborate the conclusion by SMERU that the average amount received by a typical household may not be enough to cover the cost to fulfill the required health and education behaviors. The Table shows that on average household received around IDR 1.3 million which fit the profiles depicted by SMERU. Both studies by SMERU and The Center for Health Research also found that the PKH funds were mostly used for daily consumables, such as food and school supplies. In addition to this, the SMERU study found that PKH transfer was rarely used to pay for mother and child health care services.

In addition to the above challenges, the studies also highlight the problem of health and education services availability to serve the beneficiaries. The Center for Health Research, for example, found that half of the sampled *Puskesmas* in West Java did not have BCG vaccine in stock for the previous 12 months. Although there were some improvements in the availability of Integrated Health Post *(Posyandu)* services to the beneficiaries, the SMERU study found some challenges for households to obtain these services due to the remoteness of the area where they live or to the limited number of *Posyandu*'s cadres or midwives.

2.4.5 The PKH Pilot Impact Evaluation Results

The results of the World Bank's impact evaluation of the pilot program are summarized in Table 2.6. Note that the World Bank estimated three types of impacts: placement effect, participation effect and spill-over effect. The placement effect compares the outcomes of all eligible households in the treatment area (irrespective of actual PKH receipt) with all eligible households in the control group. The participation effect compares the outcomes of households in the treatment area who had received PKH transfers with the outcomes of *similar* eligible households in the control area.[17] The spill-over effect (within-sub-districts spillover effect) compares outcomes of eligible *non*-beneficiary households in the treatment areas to *similar* eligible households in the control area.[18] In addition to this, each of these impacts was estimated using three different regression specifications: (1) with covariates, baseline values and a dummy for panel observations; (2) with *(*only) baseline values and a dummy for panel observations; and (3) with *(*only) covariates. To simplify Table 2.6, when the results are statistically significant for *all* specifications, only the numbers from the first specification are presented and it is presented without *any* superscript. If the results are statistically significant for *only one* specific specification but not for the others, the significant specification result is shown and the superscript indicates which specification is significant (see Notes under Table 2.6). If the results are significant for *two* specifications, *no* significant results are shown. Instead, *only* the superscripts indicating the *two* significant specifications are shown. Lastly, the results are denoted as not statistically significant only if the results from *all* specifications are *not* significant. All estimations use an instrumental variable (the initial random assignment) to correct for the contamination during the implementation of the program (see sub-section 4.3), thus all the estimation results are *Local Average Treatment Effect* (LATE) estimates.

Table 2.6 shows a positive impact of the program on household welfare only for health expenditure and a negative impact only for tobacco expenditure. The

[17] To find *similar* households in the control areas, a propensity score matching method was used.

[18] Also using a propensity score matching method to find similar households.

program also has *spill-over effects only* on food and total expenditure per capita in the estimation *only when using the baseline values and the panel dummy* (i.e. Specification (2)). However, the program has no impacts on any other expenditure, not even for expenditure on protein, which was expected to increase due to the cash transfers. The World Bank report proposes that these weak results are due to the long length of time between the PKH transfers and the survey. Drawing from the experience of the UCT in 2005, the report contends that the transfers were likely to be spent within one week of being received and thus could not be captured by the survey due to the design of the questionnaires.[19].

For health behaviors, the evaluation found significantly positive impacts for beneficiaries mainly on health services visits, such as visits for pre-natal care, post-natal care, and child weighing. The program was also found to significantly increase the usage of professional medical services for deliveries and public health facilities for outpatient visits. However, none of the estimates for consumption of Vitamin A is statistically significant. Furthermore, the estimates for immunization are significant only for the participation effect, and only at the 10 percent level. The program, however, consistently shows positive impacts on outpatient visits of *other* family members to both public and private health facilities, suggesting spillovers through fungibility.

Despite some improvements in health behaviors, there is no evidence that they led to better long-term health outcomes. The World Bank report argues that: "Malnutrition and child mortality rates, however, are not expected to improve within the short three-year period of the pilot project" (World Bank, 2008).

[19]The questionnaires asked food expenditure *only* for the previous week, and non-food expenditure for both the previous month and previous year from the time of the interview.

However, studies by Gertler (2004) and Attanasio et al. (2005) on Mexico's and Colombia's CCT programs, respectively, show positive impacts on child health outcomes after only two or three years of operation for those programs. In addition to this, and contrary to expectations, reports of infant diarrhea and fever among 0 to 3 year old children among beneficiary households *increased* by 3 and 4 percentage points, respectively. The World Bank attributes this increase to these households' use of primary health care services, so that it mainly represents an increase in reporting in the household survey, not an increase in the incidence of diarrhea and fever among young children. However this argument is somewhat speculative. Furthermore, the program also found an *increase* in child mortality (6-11 months old) for the placement effect (using the first specification) and participation effect (for all specification).

The report also conducted some additional estimations, only for the placement effect, disaggregated by public service availability, parental education, relative income levels and gender, as shown at the bottom of Table 2.6. The public service availability is proxied by Java and off-Java or rural and urban status. The results show that the impacts are more pronounced if beneficiaries live in Java or in urban areas. This suggests that larger effects will be found if more or better health facilities are available for the beneficiary households. The results by different parental education levels show mixed results between father's and mother's education. Mothers who have formal education seemed to have better health behaviors, yet fathers with no formal education were more likely to have their children weighed. The strong positive impacts are also greater for relatively wealthy households, which is contrary to the program's goal of improving outcomes for the poorest of the poor. This may indicate that the program needs households to have some initial threshold of income to have greater impacts on child health. Lastly, households with a female head tend to have stronger health impacts, although boys were more likely to have their immunizations.

2.5 Methodology

This section is divided into two parts. The first part presents a theoretical foundation for this study using the concept of theory of change to construct the causal changes of the PKH program. This theoretical construct is then used to propose several hypotheses to examine the efficacy of the PKH program. The second part focuses on the empirical strategy to test all the proposed hypotheses.

2.5.1 The Theory of Change

To examine the mechanisms that explain the impact (or lack thereof) of the CCT program in Indonesia, this subsection develops a theory of change to construct the causal chain, and the assumptions behind it, that would appear to underly the design of the program. Because there has been no official report that provides the theory of change for the Indonesian CCT program, this study develops its own theory of change based on similar research for other countries by Baird et al. (2013); Gaarder et al. (2010); Gertler et al. (2011); Imas and Rist (2009). The assumptions posited by this study's theory of change are adapted from Gaarder et al. (2010). Although the World Bank report (2011) does not provide a theory of change, these assumptions can be derived implicitly from this report and from studies by Febriany et al. (2011) and Center for Health Research (2010). This theory of change is then used as a basis for the hypotheses proposed in this study. Figure 2.4 provides a diagram that schematically represents the proposed theory of change for the PKH program.

Figure 2.4 shows the complexity of the causal chain underlying the CCT program. It shows the policy inputs (the CCT program) that are targeted to influence the outcomes, both intermediate (required health behavior and other factors that improve health) and final (health status) outcomes. By design, the CCT program is aimed to influence the intermediate outcomes through the demand for health services. The demand should increase due to the behaviors that are required in order to receive the cash transfers. The program is not designed to improve the supply and quality of health services. These health services are *assumed to exist* and thus the program does not directly change them. The demand channel includes both the *income effect*, brought about because the transfers increase households' incomes, and the *price effect* that occurs through the conditionality of the transfer.[20] One rationale for the conditionality in CCT programs is the assumption that the income effect from a pure cash transfer may not be enough to induce a behavioral change that will improve child health. Hence conditionality on behaviors that should improve child health is expected to increase investments in child health relative to an unconditional cash transfer program by creating a price effect that reduces households' costs of investing in child health. Besides these two economic factors, the CCT program can also influence the demand for investments in child health through a change in households' preferences. For example, by giving money to mothers, their status inside the household may increase, which then may influence the overall household demand for children's health care.

[20]Note that the *unconditional* cash transfer program would have an income effect but no price effect.

The solid lines represent direct channels through which the program is designed to influence the outcomes, while the dashed lines represent plausible indirect channels. This is why the lines connecting to and from the non-economic factors of the demand are dashed as this channel is only indirectly targeted by the program. Similarly, the lines connecting to and from the supply of health services are also dashed, since the supply and quality of health care services are not directly affected by the program. Note also that the arrows to and from the supply of health services go in both directions. This is because the supply of health services not only influences the intermediate and final outcomes, but can also be affected by changes in demand and outcomes. Thus this can create a feedback loop within the system. For example, due to an increase in demand of basic child health care, the price of those services could increase which could dampen the overall effect of increased demand for child health care.

This causal chain represented in the diagram depends on several implicit assumptions (Gaarder et al., 2010). First, the program assumes that poor households did not invest sufficiently in preventive health services, and that the conditional cash transfers will increase the use of those health services. It is a stylized fact that poor households in developing countries rarely use preventive health care and also have low health status (Dupas, 2011; O'Donnell, 2007; Wagstaff et al., 2004; Wagstaff and Claeson, 2004). In general, barriers to the utilization of preventive health care could come from either the demand side or the supply side of health care services for poor households. A large enough conditional cash transfer for poor households can be a powerful incentive to increase their demand for health care utilization. However, the effect of such transfers on the intermediate outcomes in Figure 2.4 may be small if those intermediate outcomes have an upper bound and many or most households are already close to that upper bound, e.g. immunizations have a clear upper bound that the households are already close to reaching. The World Bank, SMERU and Center for Health Research reports indicate that the Indonesian CCT program has changed children's health utilization only marginally (see sub-sections 4.4 and 4.5). Thus, drawing from this first assumption, two hypotheses can be proposed. The *first hypothesis* posits that the health behavior expected to be improved by the CCT program might have already been part of most households' behavior before the CCT program began, i.e. close to the upper bound. If this is the case, the program impacts might not be as large as initially expected. The *second hypothesis* will test whether the amount of cash received is enough to induce households to invest more in preventive health care for their children. In Figure 2.4, these two hypotheses are represented by the text symbols H.1 and H.2, the number of which represents the corresponding hypothesis. The symbols are placed near the corresponding arrows that pertain to each hypothesis. This is why both Hypotheses 1 (H.1) and Hypothesis 2 (H.2) are located *between* the two lines connecting the price and income effects to the intermediate outcomes.

The second assumption to be examined is that the increase in the use of health services will improve the health status of the users. This assumption rests on several prior assumptions, such as the quality of services provided at the health facilities, and also the quality of the substitute products and services. The program essentially assumes that the health centers provide a sufficient quantity and quality of health care, and that the costs of getting the care do not threaten the future health of the beneficiaries (e.g. by increasing very high out of pocket spending). It is further assumed that the use of these services will improve the health status, in particular the use of the specific health care required (conditioned) by the program. Related to this assumption, the reports for the Indonesian CCT seem to indicate some concerns regarding the quality and accessibility of health services for the program beneficiaries. These assumptions raise two more hypotheses that will be tested. The *third hypothesis* posits that the quality of services in the CCT program area may not be sufficient to induce significant improvement in child health, e.g. vaccines are not available at health centers. And the *fourth hypothesis* proposes that the required health behavior imposed by the programs may by themselves have very little effect on child health. In a similar manner as the first two hypotheses, the third and fourth hypotheses are denoted as H.3 and H.4 in Figure 2.4.

A third assumption of the program is that the cash transfer is designed to influence health status mainly through the use of health care and improved nutritional inputs. Although the CCT program in general does not specify what the cash can be spent on, it is generally assumed that the program will affect health outcomes both through conditioning on preventive health care use (price effect) and through households' ability to purchase higher quality of food (income effect). As such, intra-household allocation plays an important role in ensuring that this channel works to improve children's health. An intra-household allocation of household resources that directs the cash transfer away from beneficiary children may influence the results of the program in an opposite way than expected. Furthermore, assuming child health is a normal good, there should be some income effect of the cash transfer. Although this could be very small. This assumption thus leads to the *fifth hypothesis* that will be tested, which is whether households allocate the cash transfer to benefit children's health or allocate those funds in a way that does not benefit the beneficiary children. This hypothesis is denoted as H.5 in Figure 2.4.

The fourth assumption is that conditionality needs to be enforced to achieve the desired level of health care consumption. One unique characteristic of CCT programs is the requirement that households carry out some type of behavior. Given the design of the program, the enforcement of the conditionality would appear to be an essential component for the program's success. The report by SMERU and The Center for Health Research, however, indicates weak or even nonexistent enforcement of the Indonesian CCT program's conditionality requirements for households. Thus, the *sixth hypothesis*, to be tested, will therefore examine whether lack of enforcement of the required health behaviors may reduce the program's impact on children's health outcomes. This hypothesis is represented in Figure 2.4 as H.6.

Related to the fourth assumption is the requirement that the transfers be received by the mother. This assumption is based on many studies (among such studies are research by Beegle et al. (2001); Maitra (2004); Quisumbing and Maluccio (2003)) that show the positive impacts of increased females' status within the household on prenatal care and child rearing. Thus the CCT program requires the transfer to be given to mothers to improve their control of household economics resources and their ability for decision-making. This would hopefully benefit their children more compared to giving the money to the fathers. In a way, this requirement is a kind of implicit conditionality. Thus, the last hypothesis to be examined is whether the child health outcomes vary according to whether the mothers received the transfer, which is denoted as H.7 in Figure 2.4.

There are two other assumptions of the CCT program that will not be examined by this study due to data and methodological limitations, and thus they are omitted from Figure 2.4. The first assumption is that the staff and beneficiaries of the program have sufficient and correct information about the program. This assumption is crucial as misinformation may lead to unintended outcomes, such as an increase in fertility. The World Bank evaluation of the Indonesian CCT program implementation indicates that there have been some problems regarding the way the information about the program was disseminated (see sub-section 4.4). However, the data on this program do not allow for examination of this assumption quantitatively as the data contain no information on the knowledge that different stakeholders (households, village heads and health professionals) have about the program. The second assumption that cannot be tested is that the program assumes that the outcomes measured by the evaluation are those that are impacted by the program. This is because the impacts of the program often depend on what is being measured and when the evaluation is conducted. For example, there have been mixed results of CCT programs impacts on nutritional-related indicators, such as anthropometric z-scores. However, it is not entirely clear whether these results are driven by the uneven success of the programs or by the limitations of such measures as impact indicators. Given that no reliable methodology can be used to test this, this study will use several different measurements of child health to partly address this issue.

2.5.2 Estimation Strategy

Before discussing the estimation strategy to address the hypotheses proposed in the previous sub-section, balance check results will first be presented to investigate whether the randomized assignment was correctly implemented. Tables 2.7

and 2.8 provide a general balance check at baseline between the communities that were assigned to the treatment group and the communities that were assigned to the control group, focusing on health variables for children age 0-3 years old at baseline. Standard errors are clustered at the sub-district level. None of the baseline differences is statistically significant. In addition to these child-health variables, Appendix Table A1 provides balance checks for household characteristics. The results are similarly insignificant except for the ever receive UCT transfer variable. Given that only one variable out of all 64 examined-variables is significant (ever received UCT), it is reasonable to conclude that the program implementation follow the randomized assignment correctly. Balance check results from the World Bank's baseline report are also presented in Appendix Table A2, A3 and A4. Note that there are several differences in these results and the World Bank study's balance checks, such as for the weighed at least twice in last month variable and receiving vitamin A at least twice per year variable. These differences might be caused by the differences in the treatment of outliers and missing values.

In addition to balance checks, Table 2.7 also shows that less than 50 percent of children have achieved age appropriate vaccination, with distribution of vaccination to be highest for very early age immunization (BCG, 1st and 2nd Polio, 1st and 2nd DPT, and 1st Hepatitis B vaccines). On a more positive note, only around 25 percent of children were not weighed in the last 2 months and more than 60 percent of children received Vitamin A at least twice per year as recommended. On child health outcomes (Table 2.8), only a small percentage of children were either malnourished or severely malnourished. Nevertheless, the rate of illness incidence for the the last month is quite high, at around 70 percent.

To test the seven hypotheses, t-tests and regression methods will be employed, all of which exploit the Randomized Control Trial (RCT). Given the contamination during the program implementation (see sub-section 4.3), the estimation methods will be adjusted to address this potential source of bias. In the ideal scenario of an RCT, where the program was implemented exactly according to the initial design and all individuals in the treatment group choose to participate in the program, the Average Treatment Effect (ATE) can measure the average impact of the program on the population of intended beneficiaries. The ATE is defined as the average impact of the program for the *whole* population, i.e:

$$ATE = E[Y_1 - Y_0] = E[\Delta] \tag{2.1}$$

where Y_1 and Y_0 represent the values of the outcome variable conditional on being treated (Y_1) and not treated (Y_0), and Δ denotes $Y_1 - Y_0$.

Unfortunately, the implementation of many RCTs is less than ideal, which creates complications in estimating ATE. One such problem is that some beneficiaries in the treatment group choose not to get treated, and a consequence of this is that ATE can no longer be estimated. In this case, provided that no one in control group receives the treatment, only the Average Treatment Effect on the Treated (ATT) and the Intent to Treat (ITT) effects can be estimated. ATT is defined as the impact of the program on *the program's participants,* instead of the impact on the whole population as in ATE , i.e.:

$$ATT = E[Y_1 - Y_0|P = 1] = E[\Delta|P = 1] \tag{2.2}$$

where Y_1, Y_0 and Δ are defined as the above, but now it is conditional on P (participation) which takes the of value 1 if the household is treated (participated in the program), and 0 otherwise. On the other hand, ITT is defined as the impact of the program on those that are *offered* the treatment, and it is defined as:

$$ITT = ATT \times Pr[P = 1] \tag{2.3}$$

where ATT and P are the same as above. In contrast to ATT, but similar to ATE, ITT is defined for the whole population, regardless of their actual participation, while ATT is defined only for those who participate in the program.

Unfortunately, none of these three indicators of program impact can be estimated for the CCT program in Indonesia. This is because the program not only has some beneficiaries in the treatment group whose offer of treatment was delayed, but it also has some households in the control group who were able to get the treatment. Given this situation, only the Local Average Treatment Effect (LATE) can be estimated. Estimation of LATE uses an Instrumental Variable (IV) approach to estimate the average impact of the program on the *compliers*. LATE is defined as the impact of the program for those whom the IV induces the impact, or:

$$\text{LATE} = E[Y_1 - Y_0 | P_0 = 0, P_1 = 1] \tag{2.4}$$

where P_0 is the value of P when assigned to the control group and P_1 is the value of P when assigned to the treatment group. People for whom $P_0 = 0$ and $P_1 = 1$ are the population that follows their random assignment; they are also known as ”compliers”.

To estimate LATE, one can use IV regression methods:

$$Y_{ihst} = \delta + \gamma P_{ihst} + X_{ihst} + \epsilon_{ihst} \tag{2.5}$$

$$P_{ihst} = \alpha + \beta R_s + X_{ihst} + u_{ihst} \tag{2.6}$$

where equation (2.6) is the first stage regression and equation (2.5) is the main equation to be estimated. In terms of notation, R is the instrumental variable, which in this context is the initial random assignment for sub-districts, which equals 1 for sub-districts randomly assigned to the treatment group or 0 for sub-districts randomly assigned to the control group. P is defined as program participation as measured at the follow-up survey. Lastly, X_{ihst} is a vector of control variables for individual i in household h in sub-district s at time t that may be included to increase the precision of the estimates.

Returning to the hypotheses, this study will test the following seven hypotheses to understand better the small impacts of Indonesia's CCT program on child health:

Hypothesis 1 The program might be reinforcing behaviors that are already practiced by most households.

Hypothesis 2 The cash transfer amount is too small to induce an increase in preventive health care investments for children.

Hypothesis 3 The supply of health services in CCT program areas is inadequate.

Hypothesis 4 The program's required health behaviors may by themselves have very little effect on child health.

Hypothesis 5 Households may allocate the cash transfer or reallocate other expenditures in a way that will *not* benefit the beneficiary children.

Hypothesis 6 Lack of enforcement of the health conditionality may reduce the program's impact on children's health outcomes, due to little change in health behaviors.

Hypothesis 7 Child health outcomes are less influenced by the transfers because they are often not collected by the mothers.

To test the first hypothesis, whether the health behaviors at the baseline are significantly different from the recommended health behaviors, simple t-tests will be used to see whether households were already carrying out the required levels of health behaviors for their children at baseline. The tests will focus on the program's required behaviors, i.e. growth monitoring, vitamin A consumption, and complete immunization as appropriate given the child's age.

To test the second hypothesis, that the amount of transfers was not large enough to induce behavioral change, the cost of the required health behavior is calculated to be compared with the average amount of transfer that the household received. The data for the cost of health services come from two different data sets, one is from *puskesmas* level data and another is from household level data. The cost for vaccines at the household level data is based on the cost of each vaccination that the household has ever paid. The household level data do not have specific questions on the cost for weighing and Vitamin A, thus it is approximated by using the questions on activity on last *posyandu* visit and amount paid for that visit. Similarly, for *puskesmas* level data, the cost for visits can only be approximated by the cost for new visits and follow-up visits. Note also that *puskesmas* level data grouped vaccines into a larger category, for example: the costs for 1st through 4th polio vaccines is combined into the cost for a polio vaccine.

In regards to the third hypothesis, that the CCT program sub-districts may have inadequate supplies of health services, summary statistics of health services indicators will be presented. The summary statistics will give a general picture of whether the health facilities in the vicinity of the households are adequate to serve the increase in demand induced by the PKH program. The variables included in the summary statistics span from location of the nearest *posyandu* to availability of vaccination in health facilities. In addition to the summary statistics, LATE estimation using health services indicators as interaction variables will be conducted. To measure availability of health services for the estimation, an index of a health services will be constructed using all the variables included in the summary statistics. Thus, IV regression from Equation (5) and (6) will become:

$$Y_{ihst} = \delta + \gamma P_{ihst} + \tau I_{s,t-1} + \theta P_s \cdot I_{s,t-1} + X_{ihst} + \epsilon_{ihst} \tag{2.7}$$

$$P_{ihst}, P_{ihst} \cdot I_{s,t-1} = \alpha + \beta R_s + \zeta I_{s,t-1} + \eta R_s \cdot I_{s,t-1} + X_{ihst} + u_{ihst} \tag{2.8}$$

where R, P, and X are defined as the above. $I_{s,t-1}$ is the health services index at baseline and Y_{ihst} is child health behaviors and outcomes. The health services index is constructed using principal component analysis. Because this index represents a more general measure of health services, an estimation using a specific index on vaccine availability will also be conducted on vaccine-related outcomes (e.g. completed vaccination). These estimations are conducted to specifically address the finding by Smeru's study of inadequate medical supplies in the PKH program area. The data on health services is from *puskesmas*, village and household level data.

To test the fourth hypothesis, that the imposed health conditionality has small effects on child health outcomes, a two step estimation of a health behavior index on health outcomes will be conducted:

$$Y_{ihst} = \delta + \gamma B_{ihst} + X_{ihst} + \epsilon_{ihst} \tag{2.9}$$

$$B_{ihst} = \alpha + \beta R_s + X_{ihst} + u_{ihst} \tag{2.10}$$

where Y_{ihst} is one of several possible child health outcomes and B_s is the health behavior index. X_{ihst} and R_s are defined as above. The Indonesian CCT program stipulates three health behaviors that the households need to fulfill in order to receive the transfers: growth monitoring, vitamin A consumption and completion of immunization. The health behavior index is constructed by taking the average of the three indicators that have been fulfilled by the households. For example, the index will equal 0 if households *did not fulfill any* of the required behaviors and will equal 1 if households fullfil *all* of the requirements, with numbers in between if households only partially fulfill the required behaviors. Thus all possible values are 0, 1/3, 1/2, 2/3 and 1. Because the health behavior index is endogenous in equation (9), it will be instrumented by the initial random assignment of the program. Separate estimations for each required health behavior will also be conducted to see whether the interaction between the program and the impact of the program is due to a specific health behavior.

To test the fifth hypothesis, whether households reallocate their expenditures away from child health expenditure, LATE estimations using the IV method, as shown in equations (2.6) and (2.5), are conducted. To test this hypothesis, Y

is now defined as either child food consumption, consumption of ”adult” goods, or outpatient visits. The PKH survey includes detailed data on household’ expenditures, including food and non-food consumption. Given that there is no individual level data on adults’ food and non-food consumption, consumption of ”adult” goods can be approximated only by household consumption of alcohol and tobacco, which are assumed to be consumed exclusively by adults. The child food consumption variable is used to examine the child nutritional patterns that are expected to be changed by the program. Lastly, the household data also provide outpatient visits for all household members. These estimations are intended to give a general picture of the program influences on the health seeking behavior of the child and other household members, in particular whether the extra money from the cash transfer was spent for the benefit of adults members. Thus, the estimation of outpatient visits will be done separately for child and adult outpatient visits. For the purpose of this study, adults are defined as household members whose age is above 18 years old. This cut-off is chosen because the child health and education component were collected for household members between 0 and 18 years of age.

The sixth hypothesis of lack of compliance with the required behavior will be tested by conducting estimates of required health behaviors on PKH receipt, as defined by the following:

$$RE_h = \alpha + \beta RB_h + X_h + \epsilon_h \tag{2.11}$$

where X is defined as the above, while RE denotes PKH receipt by beneficiary households and RB denotes required behavior which will equal 1 if the household fulfilled *all* child health related behavior, and 0 otherwise. Had the conditionality been enforced, non-compliance with the required health behavior should have led to a reduction or an end of the transfers to the households. As a measure of PKH receipt, three measures will be used. The first is whether the most recent transfer received was within the past three months; the second is the frequency of transfer in a year, and the third is the amount of the last transfer. Note that the estimation results can be interpreted only as a correlation due to possible endogeneity problem (reverse causality and measurement errors). Furthermore, the estimation will be conducted only for the program participants.

Lastly, to test the seventh hypothesis, that child health behavior and outcomes vary according to whether the transfer is collected *only* by mothers, an estimation will be conducted to see whether child health behavior and outcomes are correlated with the lack of compliance on this implicit conditionality. The estimation equation will be:

$$Y_{ihs} = \alpha + \beta M_{ihs} + X_{hs} + \epsilon_{ihs} \tag{2.12}$$

where Y is defined as either child health behavior or outcomes, M is defined as whether the transfer was collected by the mother (1 if collected by mothers, 0 otherwise) and X is defined as above. Similar to Hypothesis 6, the estimation will be conducted only on program participants, and due to endogeneity problems it can be interpreted only as a correlation.

2.6 Results

The following sub-sections will present the results of this study. The first sub-section presents the LATE estimation results for child health behaviors and outcomes, while the second sub-section presents the tests of the seven hypotheses.

2.6.1 Estimation Results

Table 2.9 provides summary statistics for all of the control variables that are used in the estimation. Before investigating the seven hypotheses, LATE estimates will be presented for several child health behaviors and outcomes of interest to verify the generally small impacts of the program on these outcomes. Following the World Bank report, in addition to the required child health behaviors–growth monitoring, consumption of Vitamin A and completion of childhood immunization–estimates will also be presented for other important health behaviors: has ever been breastfed; length of breastfeeding; waiting time for breastfeeding after birth; and outpatient visits to different health facilities (traditional, private and public). Growth monitoring will take the value of 1 if children were weighed according to schedule at the health center (monthly for infants 0-11 months old, or quarterly for children age 1-6 years old), and 0 otherwise. Completion of childhood immunization is constructed using the age appropriate requirement for childhood immunization.[21]

Following Gertler (2004) and World Bank (2011), several indicators are used to measure child health outcomes: morbidity, weight-for-age, height-for-age, weight-for-height, malnutrition (z-scores ≤ -2), and severe malnutrition (z-scores ≤ -3). Morbidity is defined as the parents' report that their child was ill in the four weeks prior to the survey. In the case of Indonesia's CCT household survey,

[21] Childhood immunization requirements differ by age. In the first month of life, children are required to get the first Hepatitis vaccine. At one month, they are required to get BCG vaccine and the first Polio vaccine. At two months, the children are required to get the first DPT in addition to the second Hepatitis and Polio vaccines. At three months, the third Hepatitis and Polio vaccines, plus a second DPT vaccine should be given. At four months, the last DPT, Hepatitis and Polio vaccines should be given. Lastly, at nine months, the children should get the measles vaccine.

the following illnesses are considered: diarrhea, fever, cough and acute respiratory infection (ARI). The morbidity estimates are conducted separately for each illness. Because these morbidity measures can be criticized as being subjective, weight-for-age, height-for-age and weight-for-height z-scores are used to provide a more objective measure of child health; these are calculated using the World Health Organization (WHO) growth reference standards. In addition to these outcomes, estimates are also conducted for mortality during the program pilot period for different age groups of children. Finally, also following the World Bank, the estimations are conducted using three different specifications. The first specification includes covariates and the baseline value of the dependent variable.[22] The second specification includes only baseline values. And lastly, the third specification includes only covariates. Although the World Bank's report estimates three different impacts (placement, participation and spill-over effects), this study estimates only the placement effects (i.e. LATE estimation of ITT effects using all observations).

Tables 2.10 and 2.11, respectively, show the LATE estimation results for child health behaviors and health outcomes for this study. The two tables show some impacts of the program on the health behavior indicators, but no positive effects on health outcomes. Among the three required behaviors for transfers, the program has significantly positive impacts on only one, namely an increase in child health visits that is significant at the 1 percent level. Note that the results

[22]The covariates are: household per capita expenditure, age of household head, gender of household head, proportion of household members aged 0-2 years old, proportion of household members aged 3-6 years old, proportion of household members aged 7-15 years old, household head worked in agricultural sector, household head education attainment, household's assets, social network (e.g. familiarity with village head or his/her spouse), community participation (e.g. participation in social service group), UCT households, have health insurance for poor (*Askeskin*).

for weighing for child age 0-11 months do not include baseline values because these children were born after the baseline survey was collected. In addition to this, the program also increased child and household members' visits to public health services. Child visits to public health services are higher than the control group by 7 or 8 percent, which is significant at the 1 percent level, while all household members' visits to public health facilities is higher than the control group by around 6 or 10 percent at the 1 or 5 percent statistical significant level.

Turning to health outcomes, there are no statistically significant favorable impacts, and some impacts are unfavorable and marginally significant. The program appears to have had a negative impact on height-for-age that is significant at the 5 percent level for the specification that includes both covariates and baseline values; and at the 10 percent level for the specification that includes *only* baseline values. Similarly, the program appears to have increased the reported incidence of fevers by more than 8 percentage points at the 1 or 10 percent statistical significant levels. Aside from these two impacts, none of the estimates on health outcomes is statistically significant.

Besides the results on child health behavior and outcomes, estimations are also conducted for household expenditure. The results, presented in Table 2.12, show that only monthly expenditure per-capita on health increases, and it is statistically significant only at 10 percent level by around IDR 2000 (around 1 percent of the average per-capita income of the households in the sample). Aside from this variable, the program has no impacts on any of the other household expenditures.

These results on child behaviors, child outcomes and household expenditures hold even when the estimations were conducted only on households with only one child age 0-5 years old in the household, although the statistical significant levels are not always the same (see Tables 2.13, 2.14, and 2.15. Note that the marginal positive impact on expenditure on health completely disappear in the estimation with only one child age 0-5 years old. These results generally also hold when the estimations are disaggregated by Java/off-Java or urban/rural (see Appendix Tables A5, A6, A7, A8, and A9).[23]

Furthermore, when the estimation is limited to households with only one child age 0-5 years old, none of the estimation on household expenditures is statistically significant (see Table 2.15).

[24]

2.6.2 Hypotheses Test Results

The results for Hypothesis 1, that the program might be reinforcing behaviors that are already practiced by most households, are provided in Table 2.16.[25]

[23]Only the results from the estimations with covariates *only* are presented. The results with baseline values *only* and both covariates and baseline values are similar, and thus are not presented here.

[24]While these results are generally consistent with the World Bank's results (See Appendix Table A9 and A10), some of the results are different. For example, this study finds no significant impact of the program on household members visits to private health facilities. The World Bank report, however, found positive impacts that are significant at the 1 and 5 percent levels. As with the balance check results, these differences may be due to differences in the treatment of missing values and outliers. For example, the World Bank imputed missing baseline values using propensity score methods. This study, however, has opted to exclude observations with missing values. Furthermore, the World Bank report used data from MOSA on actual PKH transfers that are not publicly available and hence cannot be used in this study. Lastly, the World Bank report uses all observations, including split and new households, which differ from this study, which focuses only on panel households. Nevertheless, these differences are relatively minor, so this study's results corroborate the main results of the World Bank's impact evaluation in finding little or no impact of the PKH program on child health.

[25]The results presented are from the estimation using covariates *only* to allow the results on variables that have no baseline values, such as child weighing for children age 0-11 months old, who were not yet born at baseline. The complete results can be provided on request and the conclusion presented here holds even with the inclusion of these estimations using baseline values *only* and both baseline values and covariates

The table shows that, except for child check-up visits of children age 1-3 years old, most households have not invested in the required amount of child health investments related to the PKH program's conditionality. This results hold even when the tests were conducted separately for urban/rural and Java/off-Java (see Tables 2.17 and 2.18). Furthermore, these results also hold for different types of specific vaccinations and different age groups, e.g. BCG and DPT as shown in Tables 2.19, 2.20, 2.21 and 2.22. Among the specific vaccinations, the mean for some of the later required vaccinations were lower than those of the earlier ones (such as 1st Polio vaccine compared to the 4th Polio vaccine). This implies transition problems between the earlier and later vaccination that has the potential to be partly addressed by the PKH program. The mean for BCG vaccine is especially low for those in age group 0 to 9 months old. Thus, these results show that the PKH program required behaviors were not already part of households behavior on child health investment, i.e *not* close to the upper bound. This indicates that there is potential for the PKH program to improve on these behaviors.

The results for the second hypothesis, that the cash transfer amount is too small to induce an increase in preventive health care investments for children, are shown in Table 2.23. From the summary statistics, the costs for vaccines are relatively low compared to the the average yearly transfer to the household (only around 0.5 percent of the yearly transfer). As can be seen from Table 2.2, the annual transfer for children age 0-5 years old is around IDR 1,000,000 (including the fixed cash transfer of IDR 200,000), or IDR 250,000 per quarter. If compared to the cost of vaccination of around IDR 8876 (from household data) or IDR 5991 (from *puskesmas* data), the amount given by the program should be much more than enough to cover the cost of vaccination. However, these costs do not include indirect costs, such as transportation costs, which cannot be examined as these costs are not available from the data. Thus, the actual costs of fulfilling all the required behaviors may be significantly higher than reflected by this summary statistics of health services costs. Furthermore, the transfer might be allocated for bigger expenditure, such as for education and clothes. However LATE estimations on households expenditure show no significant effect of the program on any of types of expenditure, except marginally for health expenditure (see Table 2.12). In addition to this, as it will be shown in the next section, most household lives very near to the health facilities, and thus the transport costs are most likely quite small. Thus, there is no strong evidence that the amount of cash transfer is not enough to induce health care investments for children.

Tables 2.24 to 2.27 provide information relevant to Hypothesis 3, that the supply of health services in CCT program areas is inadequate. From Tables 2.24 and 2.25, health services appear to be quite accessible, and the health facilities generally have all the required health supplies to serve the households in the surrounding area. In terms of distance, most of households did not have to travel far in order to get the required basic services for child health. For example, the mean of hours needed to reach the nearest *posyandu* is just 0.204 (about 12 minutes and the mean distance in kilometers to the nearest *posyandu* is around half kilometer. Contrary to the finding by SMERU (2011), most of the *puskesmas* surveyed had all the necessary vaccines available, with weeks of shortage much less than 1 week in the previous month. These results hold even when the summary statistics are calculated separately for Java/off-Java and urban/rural (see Appendix Tables A11 and A12). Specifically for vaccination availability, the results also hold for the provinces where the SMERU's study was conducted (West Java and East Nusa Tenggara), as shown in Appendix Table A13 and A14. The village data also show that although only 13.7 percent of households live in the village with *puskesmas* located in it, time needed to reach the nearest *puskesmas* is less than 20 minutes.

To provide a more precise analysis, some estimation results using the health services indicators are presented in Table 2.26 (the first stage estimation is presented in Appendix Table A15). The two tables show that in general the health services indicators do not seem to influence the child health behavior and outcomes much. None of the estimations on child health behavior show any significant impacts for the health services indicators. Note that only the coefficient for received CCT variable are significant at the 1 percent statistical level which is consistent with the impact evaluation results showing the positive impacts of the program on child health visits. This means that the households did go to the health facilities, however, these visits do not seem to include receiving Vitamin A or vaccination for the children. To examine whether this child-health visits have any impacts on child health outcomes (through other channel not required by the program, such as receiving food supplement or other types of vitamin), the same estimations are also conducted for child health outcomes. The results, presented in Table 2.27, show that the health services indicators are statistically significant only for four estimations out of 37 estimations conducted. These results appears to suggest that the increase in child health visits may have very little to no impacts to children's health outcomes. Given the results from the summary statistics and the estimations with interaction variables, there is no strong evidence to support the notion that there is a lack of health services in the PKH areas. These results however raises questions about the efficacy of the program to increase the demand for child health investments, because despite the availability of health services and an increase in child health visits, none of this were translated into stronger impacts on child health outcomes.

The results for Hypothesis 4, that the program's required health behaviors may by themselves have had very little effect on child health, are given in Table 2.28. Similar to LATE estimation for the impact evaluation, random assignment variable is also used as an instrument for the child health behavior variables (the first stage result is presented in Appendix Table A16). Given that the estimations results are very similar in terms of statistical significance, the results presented here are only a subset of all the estimations conducted. The results are statistically significant at the 5 percent level only for reported incidence of fever. These lack of significant results are maybe caused by the strength of the IV to explain the instrumented variable (i.e. required health behavior measures). From the 1st stage of estimation (as seen from Appendix Table A16), the instrument is statistically significant for health behavior index and growth monitoring measures, but not for Vitamin A consumption and vaccination, with the F-stat ranging from 3.05 to 5.66. Overall, the results suggest that growth monitoring alone is not enough to influence child health outcomes.

Because these IV estimates are too imprecise to provide a strong test for this hypothesis, OLS estimations were conducted to examine the correlation between these health behaviors variables and child health outcomes. These estimations were conducted only for PKH beneficiary households to isolate the correlation only on those that have received the transfer. The results are presented in Table 2.29. Similar to the results in Table 2.28, the results presented here is a truncated version of all the estimations conducted. As expected, among the three required behavior variables, growth monitoring shows strong correlation with almost all child health outcomes. For some variables, the results seem to be consistent with the impact evaluation results, such as height-for-age variable that is correlated negatively with the health behavior index, growth monitoring and vitamin A consumption at the 1 percent statistical significant level. Similarly, the reported incidence of fever is positively correlated with the health behavior index and growth monitoring. Among the health outcomes that are significantly correlated with the health behavior variables, only the weight variable is positively correlated with all four health behavior variables. Nevertheless, the strong results for growth monitoring may reflect reverse causality, thus the results need to be interpreted with caution. Combining the two results (LATE estimation and OLS), we can cautiously conclude that there is no strong evidence that the required behaviors dictated by the program have significant positive impacts on child health outcomes.

Table 2.30 provides the estimation results for Hypothesis 5, that households may allocate the cash transfer or reallocate other expenditures in a way that will *not* benefit the beneficiary children. Among the measures, none of the child food consumption variables is affected by the program. Given that one channel for the program's impacts should be through child nutrition, the program has obviously did not achieve this goal. Fortunately, the program seems to have no impact on alcohol and tobacco consumption. The only variables significantly affected by the program are child and adult outpatient visits to public health services, which increased by 8 percentage points and 10 percentage points, results that are statistically significant at 1 and 5 percent levels, respectively. Note that the percentage increase for adults is higher (10 percent) than for children (8 percent). This suggests that much, and perhaps most, of the transfers may not be spent for child health investments. Surprisingly, when the same estimations are conducted only on households with only 1 child age 0-5 years old in the household, none of the estimations are statistically significant. The results appears to suggest child health visits may be conditional on adult health visits. Aside from public health visits for children and adults, the results using households with only one child age 0-5 years old still show that there are no impacts of the program on child nutrition even when there is only one child who is eligible for the program in the household. Given the data limitation, we can only conclude that the transfer does not seem to be allocated specifically for child health investments. However, it is not clear whether the transfer is used mostly for "adult" goods as the data do not differentiate household expenditure for children and adults specifically.

Given the size of the cash transfers (15 to 20 percent of poor households' per capita expenditure), the lack of impacts on household expenditures, except on health expenditures, and child consumption found by this study and by the World Bank impact evaluation report (2011) raise the following question: where did the money go? Comparing the CCT data with the Indonesia's National Socio-Economic Survey (*Survey Sosial Ekonomi Nasional - SUSENAS*), shows that the household expenditure patterns is comparable between the two data sets. The CCT data show lower expenditure values because the sample focuses on the poorest households, unlike the SUSENAS data which are nationally representative. This suggests that the results for the fifth hypothesis are less likely driven by data issues. Research by Smeru (2011) indicates that most of the cash transfers were used for immediate expenditure needs.

The results for Hypothesis 6, that lack of enforcement of the health conditionality may reduce the program's impact on children's health outcomes because the program does *not* change health behaviors, are given in Table 2.32. The results show that growth monitoring is positively correlated with months since last PKH transfer, and this is statistically significant at 5 percent level, while age appropriate vaccination is negatively correlated with months since last PKH transfer also at the 5 percent statistical significant level. However, none of the required behaviors is correlated with frequency of PKH transfer and value of last PKH transfer variables. Given that the results are relatively weak, there is limited evidence of transfers being denied or reduced in response to non-compliance. This result is consistent with the study by SMERU (2011), which found almost non-existent enforcement of the required behaviors.

Lastly, Tables 2.33to 2.36 show the results for Hypothesis 7, that child health outcomes are influenced by whether the transfer is collected by the mothers. Table 2.33 shows that a little more than 26 percent of households had someone other than the mother collect the transfer. As expected, households with higher decision-making power for mothers have a higher probability of the transfers being collected by the mothers (see Table 2.34). Distance to the nearest post office and farming household variables are negatively correlated with the probability of the transfer being collected by the mother. This indicates that there maybe costs associated with transfer collection that may need to be considered by the program to make sure that the money can be collected only by the women. The fact that more than 25 percent of sample stated that the transfer was *not* collected by the mothers appears to corroborate the previous results on the lack of compliance to the required behavior.

However, this does not seem to be strongly correlated with the health behaviors and outcomes, as shown in Tables 2.35 and 2.36. Among child health behaviors, only waiting time for breastfeeding after birth and child visits to public health facilities variables are significantly correlated to transfer is collected by mother variable, at the 5 and 10 percent levels, respectively. A relatively similar result is shown for health outcomes. Again only two variables are statistically significant, reported incidence of ARI variable (10 percent level) and incidence of cough and rapid breath (5 percent level). Given the number of estimates in Table 2.35 (18) and Table 2.36 (21), these lack of statistically significant results is consistent with the hypothesis that all correlation is equal to zero. In conclusion, despite evidence that the program's requirement of the transfers being collected by mothers, the child behaviors and outcomes appears not to be affected much by this.

2.6.3 Conclusion

The Government of Indonesia launched the CCT program in late 2007 to address the low investment in human capital among children of poor households. Between mid-2007 and late-2009, a pilot CCT program was conducted in 48 districts covering 430,000 eligible households. The transfer amount provided is around 15 to 20 percent of poor households' per capita consumption. Given the scale and coverage of the program, the relatively small impacts found in the World Bank's impact evaluation report of the program on any of the child health behaviors and outcome is quite surprising. This study thus tries to examine the causes of these disappointing impact evaluation results by proposing seven testable hypotheses to explain the results. The proposed hypotheses are: (1) The program might be reinforcing behaviors that are already practiced by most households; (2) The cash transfer amount is too small to induce an increase in preventive health care investments for children; (3) The supply of health services in CCT program areas is inadequate; (4) The program's required health behaviors may by themselves have very little effect on child health; (5) Households may allocate the cash transfer or reallocate other expenditures in a way that will *not* benefit the beneficiary children; (6) Lack of enforcement of the health conditionality may reduce the program's impact on children's health outcomes, by *not* changing the health behaviors; and (7) Child health outcomes is influenced by whether the transfer is collected by the mothers or not.

In addition to examining the underlying reasons for the small impacts, this study also examines whether the data that were collected to estimate the impacts of a program can also be used to understand the underlying mechanisms that determine whether the program worked and failed to work. This research is partly motivated by the lack of such examination in studies using the randomized control trial (RCT) method to conduct impact evaluations. Most studies using the data from an RCT stop after evaluating of the impact of the program. The data are rarely used to examine facets of the program determine whether it works or does not work. Given the high costs associated with the collection of this kind of data, the lack of comprehensive use of the data for such goal needs to be addressed. This study attempts to do this by using the Indonesian CCT data.

Starting with Hypothesis 1, that the program might be reinforcing behaviors that are already practiced by most households, the results show that the required behaviors were not already part of households behavior on child health investments. These results hold even when the test were disaggregated by urban/rural and java/off-java. The results also indicates a possible transition problem from early vaccination to the latter ones, as shown by the lower mean of the 4th Polio vaccine compared to the 1st Polio vaccine. The results thus reject Hypothesis 1 which implies that the small impact of the program is not caused by the possibility that households have reached the upper-bound of their investments in their children health.

The second hypothesis to be examined is that the cash transfer amount is too small to induce an increase in preventive health care investments for children. Examining the costs associated with the required behaviors, there is no strong evidence to support this hypothesis. The summary statistics of the costs show that the costs for vaccination are between IDR 5591 to IDR 8876, which is only around 0.5 percent of the average yearly transfer received by the households. Although there is a possibility of indirect costs that may not be reflected by the data, the results suggest that the amount of transfers does not seem to be the main hindrance to the program's success to influence child health investments.

The results for the third hypothesis, that the supply of health services in CCT program areas is inadequate, indicates that in general the health services in CCT program areas were adequate as shown by the availability of health facilities and medical supplies in these facilities. For example, the summary statistics show that most of the *puskesmas* have in stock all the required vaccines (BCG, DPT, Hepatitis B, Polio and Measles). In terms of accessibility, most of the health facilities are reachable in less than 20 minutes. The LATE estimations using health services indicators as interaction variables further provide supports for the results from the summary statistics. The estimation results show that there is no strong statistically significant impact of health services on child health behaviors and outcomes. Combining these two results (summary statistics and LATE estimations), it can be concluded that the third hypothesis can be rejected.

The fourth hypothesis test examines whether the program's required health behaviors may by themselves have very little effect on child health. The results suggest that there is a possibility that the program's required behavior may not have strong positive correlation to child health outcomes. The fact that the required behavior has positive correlation with only child weight should raise a question on whether the program needs a more directed behaviors to improve child health outcomes significantly. Nevertheless given the data are insufficient to provide a conclusive evidence, these results should be interpreted with caution.

To test the fifth hypothesis that households may allocate the cash transfer or reallocate other expenditures in a way that will *not* benefit the beneficiary children, LATE estimations were conducted on child and "adult" goods consumption. Among the estimations results, the program has positive impacts only on child and adult health visits. However, these positive impacts are no longer visible when the estimations are limited to only households with only *one* child age 0-5 years old. The results also show that the program has no impact on child nutrient which was expected to improve due to cash transfers. Thus, the estimations results fail to reject the hypothesis. This lack of program's impacts on child nutrient may have influence its impacts on child health outcomes. Given that research has shown the importance of macronutrients on child development, the program may want to consider adding a specific component on macronutrient to improve the efficacy of the program to positively influence child health outcomes.

The sixth hypothesis stated that lack of enforcement of the health conditionality may reduce the program's impact on children's health outcomes, by *not* changing the health behaviors. To test this hypothesis, the estimations of required behavior on CCT transfers receipt were conducted. The estimation results provides no strong evidence to reject this hypothesis. This possible lack of compliance to the program's required behaviors may have significantly reduced the impact of the program on child health. Without the conditionality, the program is essentially implemented as if it was an unconditional cash transfer program. The results of this study, thus, tentatively conclude that the income effect is not enough to induce higher investments in child health. Thus, the success of the CCT program may rely significantly on the enforcement of the required behaviors.

The last hypothesis to be tested is that child health outcomes is influenced by whether the transfer is collected by the mothers or not. Although a little more than 26 percent of the households had the transfers not collected by mothers (providing further support on the lack of compliance to required behavior), the outcomes do not appear to be affected by this. These results, however, only provide correlation not causation. Thus, the results provide only a tentative evidence for the rejection of Hypothesis 7.

In closing, the results show that although it is possible to examine the underlying mechanisms that explains the success of a program that use an RCT method for its impact evaluation, the data collected to evaluate the program may provide only limited information that can be used for this purpose. One example of the Indonesian data is the lack of questions for health providers on their knowledge of the program. Given their roles as the enforcers for the program, this kind of information can be used to infer whether the program was implemented correctly or to implicitly examine whether the required behaviors were enforced. It needs to be noted that the current CCT program has undergone several improvements. One of those is the enforcement of the required behaviors. Thus, the results in this study should be interpreted within the context of the pilot of the Indonesian CCT program.

Tables and Figures

Table 2.1: *Expenditure and Coverage of Indonesian CCT Program, 2007-2012*

	2007	2008	2009	2010	2011	2012
No. Households (millions)	0.388	0.621	0.726	0.774	1.052	1.454
Budget (million USD PPP)	79.244	113.065	126.688	146.049	210.181	228.287
Provinces (of 33 total)	7	13	13	20	25	33
Districts (of 497 total in 2010)	48	70	70	88	119	169
Sub-districts	337	637	781	946	1387	2001
Villages	4311	7654	9295	10998	16154	25032

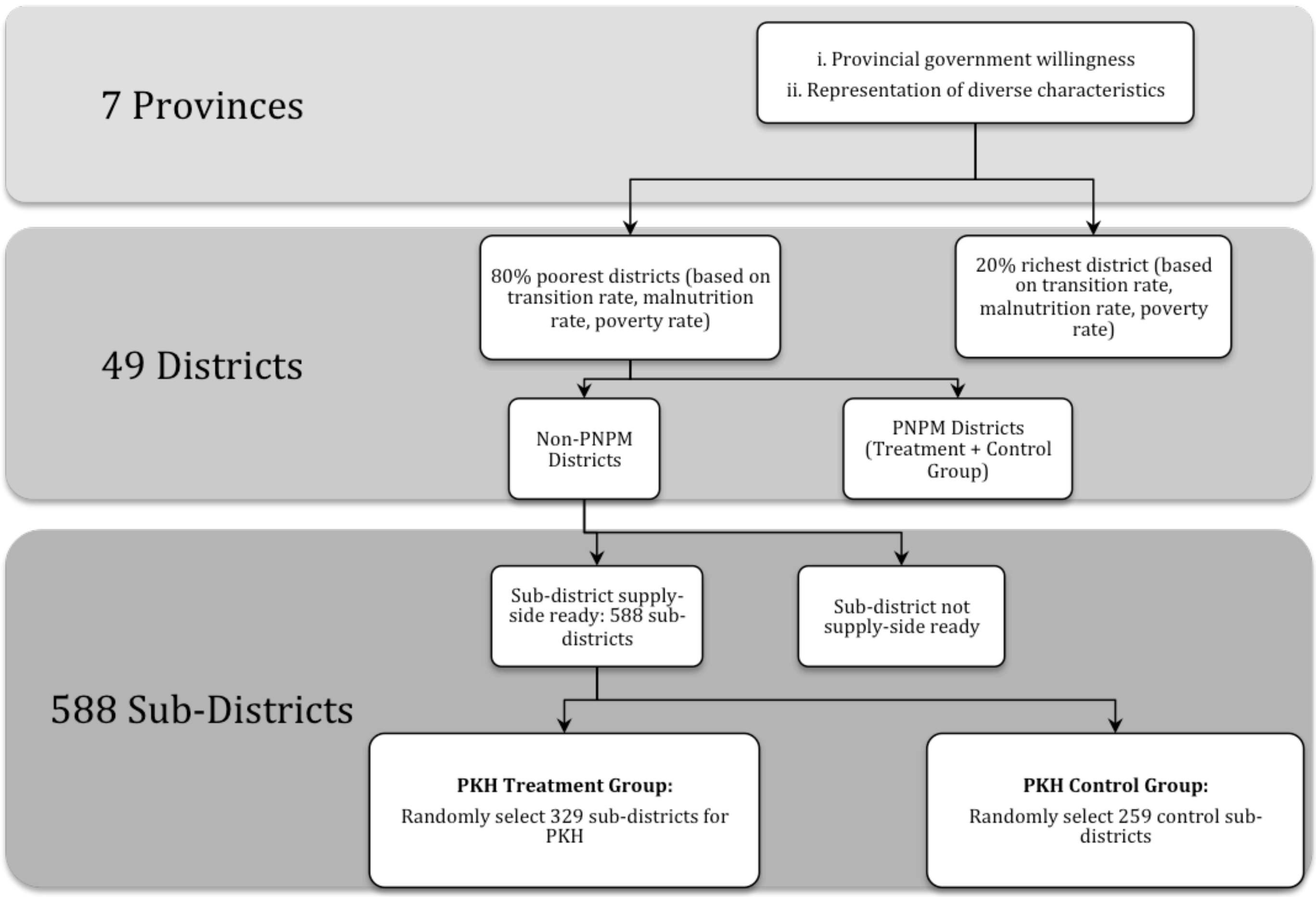
Note: 1 US Dollar was equal to IDR 9138.5 in 2007
Source: Nazara (2013)

Table 2.2: *Calculation of Annual Cash Transfer Amounts (IDR/household)*

Support scenario	Amount of transfer per household per year (IDR)
Fixed cash transfer (for all beneficiary households)	200,000
Cash transfer per household with:	
a. Children age less than 6 years (per household)	800,000
b. Pregnant or lactating mother (per household)	800,000
c. Children of primary-school age (per child)	400,000
d. Children of secondary school age (per child)	800,000
Maximum transfer per household	2,200,000

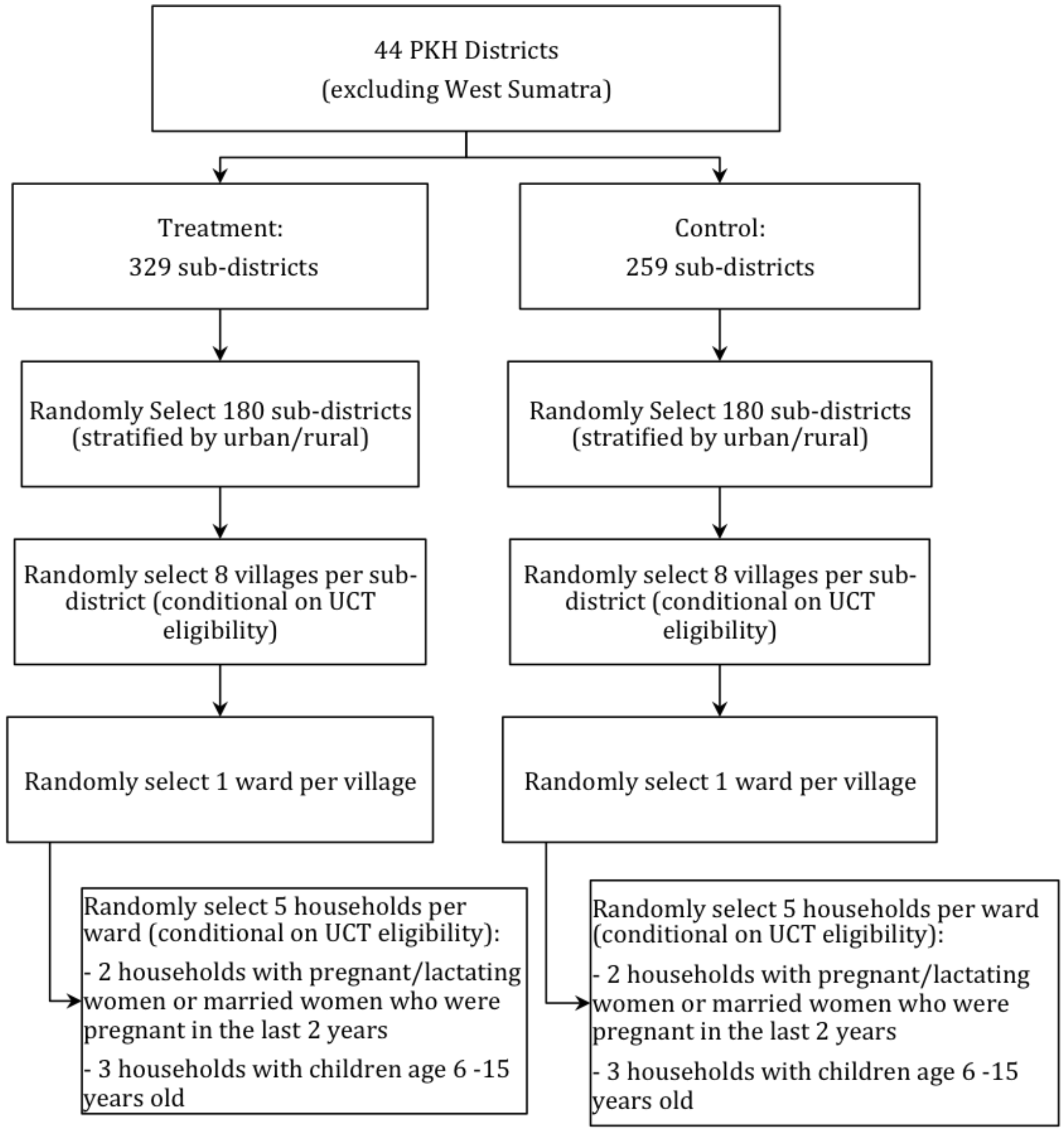
Note: 1 US Dollar was equal to IDR 9138.5 in 2007
Source: World Bank, 2011

Figure 2.1: *PKH Selection and Randomization Procedure*



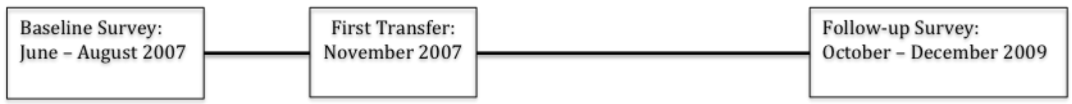
Source: World Bank, 2010

Figure 2.2: *Baseline Sample Selection for Pilot PKH*



Source: World Bank, 2008

Figure 2.3: *PKH Survey and Program Implementation Timeline*



Source: World Bank, 2011

Table 2.3: *Baseline Survey Sample*

	Treatment	Control
Sub-district	180	180
Villages	1369	1354
Households	7195	7131
Individuals	36,801	36,762
Children under 3 years	3075	3077
Children age 6-15	9396	9551
Married women age 16-49	7401	7358

Table 2.4: *PKH Program Implementation Status*

	Randomly assigned to treatment during the pilot			Randomly assigned to control during the pilot		
	All	Treated	Delayed Treatment	All	Not Treated	Treated
Sub-district	180	174	6	180	141	39
Villages	1369	1324	45	1352	1066	288
Households	7068	6955	240	7057	5571	1560
Children age 0-3 years	3081	2960	121	3097	2429	668

Table 2.5: *PKH Pilot Actual Payment*

	2007	2008	2009
Number of sub-districts	337	671	732
Number of recipient households per sub-district	1151	605	923
Average total payments per sub-district (IDR)	1.5 billion	1.45 billion	1.2 billion
Average payment per year per household (IDR)	1,308,967	1,265,341	1,308,377

Notes: 1 US Dollar was equal to IDR 9138.5 in 2007
Source: World Bank, 2011

Table 2.6: *The World Bank's Evaluation Results*

	Outcomes	Placement Effect	Participation Effect
WELFARE			
	Total expenditure, per capita	Not statistically significant	Not statistically significant
	Food expenditure, per capita	Not statistically significant	Not statistically significant
	Non-food expenditure, per-capita	Not statistically significant	Not statistically significant
Households expenditure	Health expenditure, per-capita	Higher than control group	Higher than control group
	Education expenditure, per-capita	Not statistically significant	Not statistically significant
	Alcohol expenditure, per-capita	Not statistically significant	Not statistically significant
	Tobacco expenditure, per-capita	Lower than control group[2,3]	Lower than control group
	Share of total expenditure on protein	Not statistically significant	Not statistically significant
HEALTH BEHAVIORS			
	Four or more pre-natal visits	7 percentage points increase	9 percentage points increase
	Professionally assisted deliveries	5 percentage points increase[3]	6 percentage points increase[3]
Pregnant women	Delivery at health facilities	6 percentage points increase[3]	7 percentage points increase[3]
	Two or more post-natal visits	7 percentage points increase	10 percentage points increase
	Consumption of iron tablets	Not statistically significant	Not statistically significant
	Has ever been breastfed	Not statistically significant	Not statistically significant
	Waiting time for breastfeeding after birth	Not statistically significant	Not statistically significant
	Length of breastfeeding	Not statistically significant	Not statistically significant
	2 or more weighing last month (0-11 months old)	Not statistically significant	4 percentage points increase[2]
	2 or more weighing last month (1-3 years old)	10 percentage points increase	15 percentage points increase
	2 or more weighing last month (0-5 years old)	14 percentage points increase	22 percentage points increase
Children aged 0 to 5 years old	Completed immunization by age	Not statistically significant	5 percentage points increase[2]
	Complete immunization	Not statistically significant	3 percentage points increase[1,2]
	Number of Vitamin A consumed	Not statistically significant	Not statistically significant
	Percentage of receiving Vitamin A on schedule	Not statistically significant	Not statistically significant
	Two or more Vitamin A consumption per year	Not statistically significant	Not statistically significant
	Usage of traditional health facilities	Not statistically significant	Not statistically significant
	Usage of public health facilities	Higher than control group	Higher than control group
	Usage of private health facilities	Not statistically significant	Not statistically significant
Other members of beneficiary households	Usage of public health facilities	0.5 percentage points increase	0.5 percentage points increase
	Usage of private health facilities	0.2 percentage points increase	0.2 percentage points increase[3]

[1] significant in the first specification (with covariates, baseline values and a dummy for panel observations), [2] significant in the second specification (with *only* baseline values and a dummy for panel observations, [3] significant in the third specification (with *only* covariates)
Source: World Bank (2011)

Table 2.6: ***Cont.*** *The World Bank's Evaluation Results*

	Outcomes	Spill-over effects
WELFARE		
Households expenditure	Total expenditure, per capita	Higher than control group[2]
	Food expenditure, per capita	Higher than control group[2]
	Non-food expenditure, per-capita	Not statistically significant
	Health expenditure, per-capita	Higher than control group
	Education expenditure, per-capita	Not statistically significant
	Alcohol expenditure, per-capita	Not statistically significant
	Tobacco expenditure, per-capita	Not statistically significant
	Share of total expenditure on protein	Not statistically significant
HEALTH BEHAVIORS		
Pregnant women	Four or more pre-natal visits	4 percentage points increase
	Professionally assisted deliveries	Not statistically significant
	Delivery at health facilities	8 percentage points increase[3]
	Two or more post-natal visits	Not statistically significant
	Consumption of iron tablets	Not statistically significant
Children aged 0 to 5 years old	Has ever been breastfed	Not statistically significant
	Waiting time for breastfeeding after birth	Not statistically significant
	Length of breastfeeding	Not statistically significant
	Two or more weighing last month (0-11 months old)	Not statistically significant
	Two or more weighing last month (1-3 years old)	Not statistically significant
	Two or more weighing last month (0-5 years old)	7 percentage points increase
	Completed immunization by age	Not statistically significant
	Complete immunization	Not statistically significant
	Number of Vitamin A consumed	Not statistically significant
	Percentage of receiving Vitamin A on schedule	Not statistically significant
	Two or more Vitamin A consumption per year	Not statistically significant
	Usage of traditional health facilities	Not statistically significant
	Usage of public health facilities	Not statistically significant
	Usage of private health facilities	Not statistically significant
Other members of beneficiary households	Usage of public health facilities	0.4 percentage points increase
	Usage of private health facilities	0.2 percentage points increase

[1] significant in the first specification (with covariates, baseline values and a dummy for panel observations),
[2] significant in the second specification (with *only* baseline values and a dummy for panel observations,
[3] significant in the third specification (with *only* covariates)
Source: World Bank (2011)

Table 2.6: ***Cont.*** *The World Bank's Evaluation Results*

	Outcomes	Placement Effect	Participation Effect
HEALTH OUTCOMES			
Children aged 0 to 5 years	Weight	Lower relative to control group[1]	Not statistically significant
	Weight-for-age	Not statistically significant	Not statistically significant
	Height-for-age	Not statistically significant	Not statistically significant
	Weight-for-height	Not statistically significant	Not statistically significant
	Malnutrition rates (less -1 SD of z score)	Not statistically significant	Not statistically significant
	Severe malnutrition rates (less than -2 SD of z-score)	Not statistically significant	Not statistically significant
	Incidence of fever	4 percentage points increase	4 percentage points increase
	Incidence of diarrhea	Not statistically significant	3 percentage points increase
	Treated diarrhea	6 percentage points increase[2]	7 percentage points increase
	Length of last diarrhea	Not statistically significant	Not statistically significant
	Incidence of cough	Not statistically significant	Not statistically significant
	Incidence of cough and rapid breath	Not statistically significant	Not statistically significant
	Incidence of Acute Respiratory Infection	Not statistically significant	Not statistically significant
	Treated ARI	Not statistically significant	Not statistically significant
	Incidence of illness	3 percentage points increase[2]	Not statistically significant
	Mortality rates (0-28 days old)	Not statistically significant	Not statistically significant
	Mortality rates (1-2 months old)	Not statistically significant	Not statistically significant
	Mortality rates (3-5 months old)	Not statistically significant	Not statistically significant
	Mortality rates (6-11 months old)	0.3 percentage points increase[1]	0.5 percentage points increase
	Mortality rates (0-11 months old)	Not statistically significant	Not statistically significant
DISAGGREGATED RESULTS			
Public services availability	Higher health services supply	Stronger positive impacts	N/A
Parental education	Formal educated mothers	More health behavior improvements	N/A
	No education father	More likely to be weighed monthly	N/A
Relative income levels	Richer households	Larger positive impacts	N/A
Gender analysis	Female head	Stronger positive health impacts	N/A
	Boys compared to girls	More likely to complete immunization	N/A

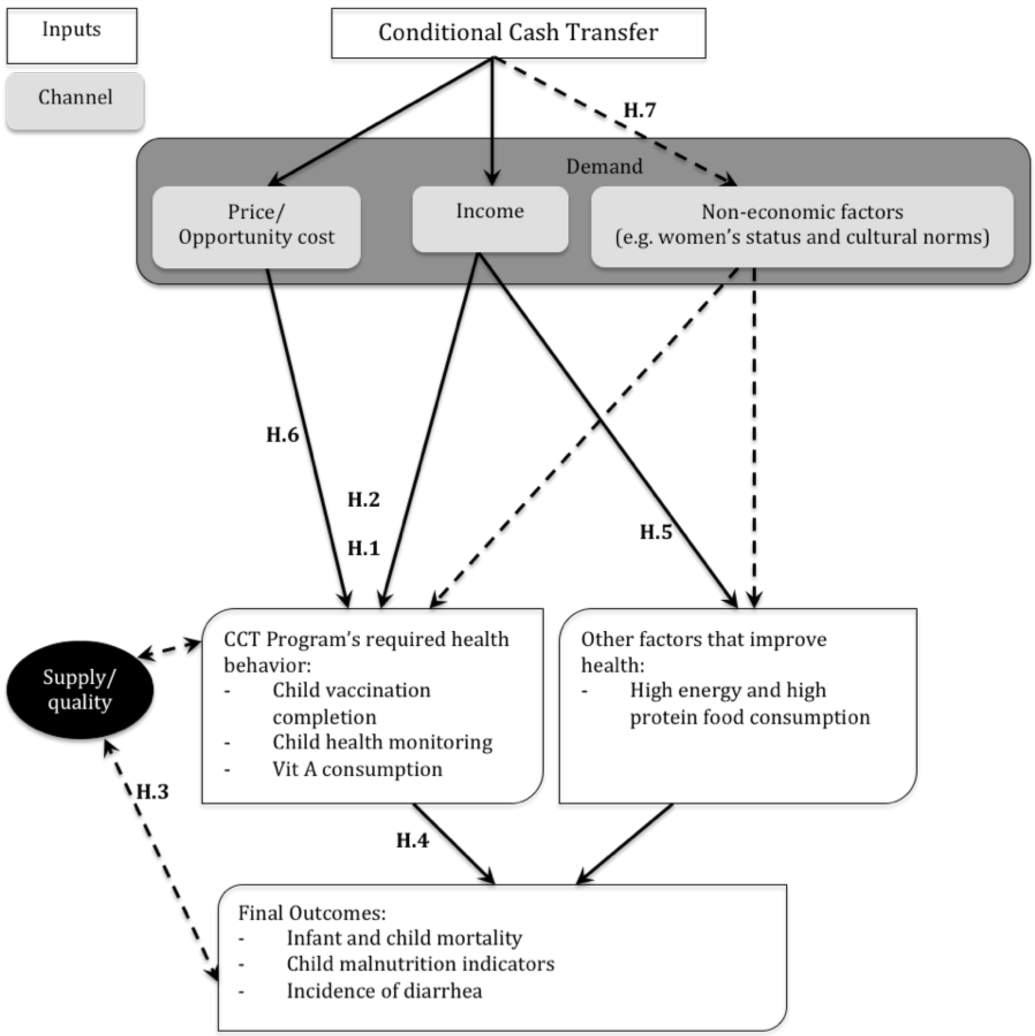
[1] significant in the first specification (with covariates, baseline values and a dummy for panel observations),
[2] significant in the second specification (with *only* baseline values and a dummy for panel observations,
[3] significant in the third specification (with *only* covariates)
Source: World Bank (2011)

Table 2.6: ***Cont.*** *The World Bank's Evaluation Results*

	Outcomes	Spill-over effects
HEALTH OUTCOMES		
	Weight	Lower relative to control group[1,3]
	Weight-for-age	Not statistically significant
	Height-for-age	Not statistically significant
	Weight-for-height	Not statistically significant
	Malnutrition rates (less -1 SD of z score)	Not statistically significant
	Severe malnutrition rates (less than -2 SD of z-score)	Not statistically significant
	Incidence of fever	3 percentage points increase
	Incidence of diarrhea	Not statistically significant
	Treated diarrhea	Not statistically significant
	Length of last diarrhea	Not statistically significant
Children aged 0 to5 years	Incidence of cough	Not statistically significant
	Incidence of cough and rapid breath	Not statistically significant
	Incidence of Acute Respiratory Infection	Not statistically significant
	Treated Acute Respiratory Infection	Not statistically significant
	Incidence of illness	3 percentage points increase[2]
	Mortality rates (0-28 days old)	Not statistically significant
	Mortality rates (1-2 months old)	Not statistically significant
	Mortality rates (3-5 months old)	Not statistically significant
	Mortality rates (6-11 months old)	Not statistically significant
	Mortality rates (0-11 months old)	Not statistically significant
DISAGGREGATED RESULTS		
Public services availability	Higher health services supply	N/A
Parental education	Formal educated mothers	N/A
	No education father	N/A
Relative income levels	Richer households	N/A
Gender analysis	Female head	N/A
	Boys compared to girls	N/A

[1] significant in the first specification (with covariates, baseline values and a dummy for panel observations),
[2] significant in the second specification (with *only* baseline values and a dummy for panel observations,
[3] significant in the third specification (with *only* covariates)
Source: World Bank (2011)

Figure 2.4: *Theory of Change for CCT Program*



Note: Solid lines represent *direct channels*, while dashed lines represent *indirect channels*.

Table 2.7: *Balance Check of Child Health Behavior*

Variable	Treatment	Control	Difference	Treatment (N)	Control (N)
Age appropriate vaccination (=1)	36.3%	35.7%	0.007 [0.022]	2900	2897
Completed immunization for children age 10 months or above (=1)	46%	44.3%	0.018 [0.027]	1920	1916
Completed immunization (=1)	31.6%	30.7%	0.009 [0.019]	2937	2927
BCG immunization (=1)	80.0%	80.2%	-0.002 [0.016]	2990	2988
1st Polio immunization (=1)	78.4%	79.8%	-0.014 [0.016]	2980	2969
2nd Polio immunization (=1)	67.3%	67.9%	-0.006 [0.019]	2954	2946
3rd Polio immunization (=1)	56.8%	58.4%	-0.015 [0.022]	2945	2925
4th Polio immunization (=1)	45.3%	44.9%	0.004 [0.022]	2936	2921
1st DPT immunization (=1)	69.5%	69.7%	-0.002 [0.020]	2946	2937
2nd DPT immunization (=1)	59.6%	59.7%	-0.001 [0.022]	2930	2922
3rd DPT immunization (=1)	51.3%	51.1%	0.002 [0.023]	2924	2917
Measles immunization (=1)	51.9%	53.1%	-0.012 [0.017]	2952	2945
1st Hepatitis B immunization (=1)	67.3%	67.3%	0.000 [0.023]	2943	2929
2nd Hepatitis B immunization (=1)	54.1%	53.5%	0.006 [0.022]	2933	2921
3rd Hepatitis B immunization (=1)	46.8%	45.6%	0.012 [0.022]	2932	2908
Not weighed in last 2 months (=1)	25.3%	24.8%	0.005 [0.018]	3066	3067
Weighed once in last 2 months (=1)	35.4%	37.9%	-0.024 [0.018]	3066	3067
Weighed at least twice in last 2 months (=1)	39.3%	37.4%	0.019 [0.020]	3066	3067
Number of times weighed in last 2 months	1.195 (0.88)	1.193 (0.89)	0.002 [0.041]	3066	3067
Receiving vitamin A at least 2 per year during age 6 months - 5 years (=1)	62.5%	63.0%	-0.005 [0.017]	2265	2231
Number of times child received vitamin A	1.582 (1.30)	1.617 (1.35)	-0.035 [0.043]	2867	2807
Number of opportunity to receive vitamin A	3.284 (1.72)	3.271 (1.70)	0.013 [0.053]	3075	3077
Rate of uptake of vitamin A from the official distribution	0.477 (0.43)	0.490 (0.46)	-0.012 [0.016]	2853	2789

Notes: The table provides the mean difference between households in treatment and control communities with standard errors clustered at sub-district level. The standard deviations are in parentheses and the clustered standard errors are in brackets, with * $p<0.1$, ** $p<0.05$, and ***$p<0.01$

Table 2.8: *Balance Check of Child Health Outcomes*

Variable	Treatment	Control	Difference	Treatment (N)	Control (N)
Incidence of diarrhea last month (=1)	27.6%	26.1%	0.014 [0.015]	3074	3075
Diarrhea treated (=1)	53.4%	55.3%	-0.019 [0.028]	847	803
Incidence of fever last month (=1)	45%	42.6%	0.024 [0.018]	3075	3077
Incidence of cough last month (=1)	54.2%	52.2%	0.02 [0.017]	3075	3077
Incidence of cough & rapid breath last month (=1)	26.3%	25.8%	0.005 [0.015]	3072	3070
Incidence of Acute Respiratory Syndrome last month (=1)	18.2%	17.2%	0.009 [0.013]	3073	3074
Treated Acute Respiratory Syndrome (=1)	63.7%	64%	-0.003 [0.033]	559	530
Incidence of illness last month (=1)	70.3%	68.8%	0.015 [0.016]	3074	3075
Incidence of diarrhea or ARI (=1)	37.8%	36.3%	0.015 [0.017]	3073	3073
Weight-for-age z-score	-0.878 (1.38)	-0.845 (1.42)	-0.033 [0.053]	2970	2966
Height-for-age z-score	-1.353 (2.18)	-1.442 (2.22)	0.089 [0.085]	2838	2755
Weight-for-Height z-score	-15.6% (1.73)	-5.3% (1.85)	-0.103 [0.074]	2784	2704
Weight-for-age: not malnourished (=1)	80.1%	79.8%	0.003 [0.013]	2970	2966
Weight-for-age: malnourished (=1)	19.9%	20.2%	-0.003 [0.013]	2970	2966
Weight-for-age: severe malnourished (=1)	5.2%	5.2%	0.000 [0.007]	2970	2966
Height-for-age: not malnourished (=1)	60.4%	57.5%	0.029 [0.018]	2838	2755
Height-for-age: malnourished (=1)	39.6%	42.5%	-0.029 [0.018]	2838	2755
Height-for-age: severe malnourished (=1)	22.1%	24.6%	-0.025 [0.016]	2838	2755
Weight-for-height: not malnourished (=1)	87.9%	87.2%	0.007 [0.011]	2784	2704
Weight-for-height: malnourished (=1)	12.1%	12.8%	-0.007 [0.011]	2784	2704
Weight-for-height: severe malnourished (=1)	4.2%	4.5%	-0.002 [0.006]	2784	2704
Height (cm)	72.183 (10.68)	71.757 (10.37)	0.426 [0.326]	2838	2755
Weight (kg)	8.652 (2.52)	8.702 (2.5)	-0.05 [0.074]	2970	2966
Neonatal mortality per 1000 births in the village	19.249 (80.46)	20.325 (112.21)	-1.076 [3.957]	4134	4168
Infant mortality per 1000 births in the village	35.46 (113.4)	38.452 (154.42)	-2.992 [5.477]	4134	4168

Notes: The table provides the mean difference between households in treatment and control communities with standard errors clustered at sub-district level. The standard deviations are in parentheses and the clustered standard errors are in brackets, with * p<0.1, ** p<0.05, and ***p<0.01

Table 2.9: *Summary Statistics of Control Variables*

Variable	Treatment	Control	Treatment (N)	Control (N)
Household size	5.749 (2.07)	5.753 (1.97)	36801	36762
Household head age	43.369 (10.78)	43.062 (10.42)	32521	32026
Household head is female (=1)	7.8%	7.5%	36801	36762
Household head working in agriculture (=1)	68.6%	66.6%	34546	34688
Household head has no schooling or did not graduate from elementary school (=1)	34.2%	32.7%	36752	36727
Household head graduated from elementary school (=1)	48.6%	49.1%	36752	36727
Household head graduated from junior school (=1)	11.2%	11.8%	36752	36727
Proportion of household members 0-2 years old	8.3%	8.4%	36801	36762
Proportion of household members 3-6 years old	2.7%	2.6%	36801	36762
Proportion of household members 7-5 years	21.8%	22.2%	36801	36762
Total monthly percapita expenditure (nominal IDR)	168714.827 (90483.09)	171728.299 (92972.28)	36801	36762
Household has television (=1)	53%	54.2%	36801	36755
Household has parabole antenna (=1)	0.9%	1.1%	36801	36755
Household has refrigerator (=1)	3%	2.9%	36801	36755
Household has motorcycle/outboard motor (=1)	16%	16.2%	36801	36751
Household has car/motor boat (=1)	0.3%	0.4%	36801	36751
Household has pig (=1)	9.2%	11%	36801	36755
Household has goat (=1)	11.7%	12.6%	36801	36755
Household has cow (=1)	7.8%	8.9%	36801	36755
Household has horse (=1)	0.6%	0.8%	36801	36755
Familiar with village head or his/her spouse (=1)	58.1%	56%	36701	36644
Familiar with village secretary or his/her spouse (=1)	51.2%	48.7%	36424	36482
Familiar with local parliament member or his/her spouse (=1)	40%	39.7%	36605	36515
Familiar with ward head or his/her spouse (=1)	81.6%	81.1%	36474	36493
Familiar with hamlet head or his/her spouse (=1)	90.5%	90.7%	33845	34010
Participate in social service group (=1)	23.9%	25.4%	36801	36762
Participate in production group (=1)	6.6%	6.4%	36801	36762
Participate in workers group (=1)	4.3%	4.5%	36801	36762
Participate in natural resource management group (=1)	0.8%	1%	36801	36762
Participate in credit/financial group (=1)	28.9%	31%	36801	36762
Participate in governmental group (=1)	6.4%	6.6%	36801	36762
Participate in religious group (=1)	59.3%	60.7%	36801	36762
Participate in recreational group (=1)	2%	1.7%	36801	36762
Participate in mass/political organization (=1)	0.8%	0.8%	36801	36762
Ever received UCT (=1)	93.9%	92.6%	36801	36762
Has Askeskin (health insurance for poor) (=1)	49.7%	50%	36801	36762

Notes: The standard deviations are in parentheses with * $p<0.1$, ** $p<0.05$, and ***$p<0.01$

Table 2.10: *Impact of the Program on Child Health Behaviors (LATE)*

	With Covariates & Baseline Values		With Baseline Values *only*		With Covariates *only*	
	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs
Ever breastfed (=1)	0.0172 (0.013)	4172	0.0168 (0.012)	5507	0.0129 (0.0110)	6108
Waiting time for breastfed after birth (hours)	0.3470 (6.263)	4303	3.0660 (5.578)	5718	-2.1590 (5.693)	6304
Length of breastfeeding (months)	-0.9220 (1.103)	3929	0.1290 (1.207)	5160	-0.5010 (0.931)	5924
Weighed once last month for children age 0-11 months (=1)	N/A		N/A		0.1760* (0.092)	915
Weighed once last month for children age 1-3 years (=1)	0.2440*** (0.061)	2494	0.2400*** (0.061)	3282	0.2320*** (0.053)	3721
Weighed once last month for children age 0-5 years (=1)	0.2780*** (0.049)	4136	0.2820*** (0.050)	5459	0.2550*** (0.045)	6075
Completed vaccination by schedule for age (=1)	0.0325 (0.062)	3204	0.0406 (0.062)	4215	0.0271 (0.059)	4981
Completed vaccination (=1)	0.0198 (0.062)	3238	0.0276 (0.061)	4268	0.0229 (0.058)	4990
Number of Vitamin A capsules received	0.2770 (0.182)	3112	0.2290 (0.187)	4061	0.1930 (0.142)	5087
Received Vitamin A twice last year (=1)	0.0426 (0.034)	3112	0.0269 (0.031)	4061	0.0280 (0.036)	5087

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Instrument: random assignment

Table 2.10: ***Cont.*** *Impact of the Program on Child Health Behaviors (LATE)*

	With Covariates & Baseline Values		With Baseline Values *only*		With Covariates *only*	
	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs
Child visit to traditional health facilities (freq)	0.0005	6421	-0.0041	8506	0.0005	6421
	(0.004)		(0.005)		(0.004)	
All household visit to traditional health facilities (freq)	-0.0021	58081	-0.0029	77836	-0.0022	58081
	(0.016)		(0.014)		(0.016)	
All household visit to traditional health facilities (=1)	-0.0004	58081	-0.00003	77836	-0.0005	58081
	(0.010)		(0.009)		(0.010)	
Child visit to public health facilities (freq)	0.0797***	6421	0.0731***	8506	0.0823***	6421
	(0.024)		(0.024)		(0.024)	
All household visit to public health facilities (freq)	0.2270**	58081	0.1840*	77836	0.2410**	58081
	(0.092)		(0.098)		(0.094)	
All household visit to public health facilities (=1)	0.0962**	58081	0.0668*	77836	0.108***	58081
	(0.0395)		(0.0400)		(0.0403)	
Child visit to private health facilities (freq)	0.0086	6421	0.0126	8506	0.0091	6421
	(0.016)		(0.015)		(0.016)	
All household visit to private health facilities (freq)	0.0461	58081	0.0539	77836	0.0491	58081
	(0.040)		(0.041)		(0.042)	
All household visit to private health facilities (=1)	0.0110	58081	0.0188	77836	0.0136	58081
	(0.025)		(0.026)		(0.026)	

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Instrument: random assignment

Table 2.11: *Impact of the Program on Child Health Outcomes (LATE)*

	With Covariates & Baseline Values		With Baseline Values *only*		With Covariates *only*	
	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs
Weight (kg)	0.0448 (0.187)	3455	0.1360 (0.176)	4563	-0.0382 (0.210)	5427
Weight-for-age	0.0300 (0.102)	3455	0.0504 (0.102)	4563	-0.0070 (0.105)	5427
Malnutrition (Weight-for-age $\leq$ -2)	0.0032 (0.038)	3455	0.0023 (0.036)	4563	-0.0140 (0.036)	5427
Severe malnutrition (Weight-for-age $\leq$ -3)	-0.0012 (0.025)	3455	0.0026 (0.023)	4563	-0.0078 (0.021)	5427
Height-for-age	-0.3360** (0.169)	3043	-0.3070* (0.177)	4033	-0.1760 (0.163)	5008
Weight-for-height	0.2510 (0.170)	2956	0.2050 (0.170)	3911	0.0253 (0.147)	4936
Reported incidence of diarrhea (=1)	0.0384 (0.034)	4170	0.0442 (0.033)	5504	0.0440 (0.034)	6105
Treated Diarrhea (=1)	-0.0086 (0.127)	252	0.0014 (0.116)	338	0.0823 (0.0757)	1226
Frequency of diarrhea last month	0.0396 (0.093)	4144	0.0370 (0.083)	5473	0.0172 (0.082)	6060
Length of last incidence of diarrhea (days)	0.1970 (0.150)	4146	0.1850 (0.139)	5476	0.1680 (0.149)	6060
Reported incidence of ARI (=1)	0.0350 (0.028)	4104	0.0343 (0.027)	5416	0.0285 (0.027)	6004

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Instrument: random assignment

Table 2.11: *Cont.* *Impact of the Program on Child Health Outcomes (LATE)*

	With Covariates & Baseline Values		With Baseline Values *only*		With Covariates *only*	
	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs
Treated ARI (=1)	-0.2320 (0.267)	110	-0.0023 (0.173)	150	-0.0102 (0.087)	712
Reported incidence of fever (=1)	0.1230^{***} (0.045)	4169	0.0873^{*} (0.045)	5503	0.1070^{**} (0.042)	6104
Reported incidence of cough (=1)	0.0405 (0.050)	4172	0.0373 (0.049)	5506	0.0377 (0.046)	6107
Incidence of cough & rapid breath (=1)	0.0285 (0.034)	4049	0.0273 (0.031)	5347	0.0155 (0.032)	5931
Reported incidence of illness (=1)	0.0778 (0.051)	4170	0.0661 (0.051)	5502	0.0778 (0.048)	6105
Mortality for age 0-28 days (=1)	-0.0023 (0.002)	10042	-0.0028 (0.002)	13204	-0.0027 (0.002)	10791
Mortality for age 1-2 months (=1)	-0.0009 (0.001)	10042	-0.0010 (0.001)	13204	-0.0009 (0.001)	10791
Mortality for age 3-5 months (=1)	-0.0005 (0.001)	10042	-0.0008 (0.001)	13204	-0.0010 (0.001)	10791
Mortality for age 6-11 months (=1)	0.001 (0.002)	10042	0.001 (0.001)	13204	0.001 (0.002)	10791
Mortality for age 0-11 months (=1)	-0.0027 (0.003)	10042	-0.0043 (0.003)	13204	-0.0031 (0.003)	10791

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Instrument: random assignment

Table 2.12: *Impact of the Program on Household Expenditure (LATE)*

	With Covariates & Baseline Values		With Baseline Values *only*		With Covariates *only*	
	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs
Total monthly expenditure per-capita (IDR)	12791.2 (10051.1)	4492	2598.8 (11074.8)	5996	2669.0 (9265.9)	58081
Monthly expenditure per-capita on food (IDR)	952.3 (1508.1)	53708	567.5 (1540.9)	71958	992.3 (1538.8)	58081
Monthly expenditure per-capita on non-food (IDR)	-173.2 (9544.8)	53708	795.5 (9201.8)	71958	1769.9 (9664.6)	58081
Monthly expenditure per-capita on education (IDR)	-1261.4 (1928.6)	53447	-884.3 (1833.9)	71588	-934.8 (1908.1)	57808
Monthly expenditure per-capita on health (IDR)	2740.1* (1641.7)	53678	3194.1* (1890.4)	71895	2667.1* (1618.3)	58068
Share of food expenditure on protein (percent)	0.125 (0.207)	53701	0.140 (0.219)	71947	0.135 (0.215)	58081

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Instrument: random assignment

Table 2.13: *Impact of the Program on Child Health Behaviors for Households with only 1 Child Age 0-5 Years (LATE)*

	With Covariates & Baseline Values		With Baseline Values *only*		With Covariates *only*	
	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs
Ever breastfed (=1)	0.0078 (0.013)	3003	0.0130 (0.011)	3949	0.0069 (0.012)	4182
Waiting time for breastfed after birth (hours)	-8.4780 (8.283)	2946	-4.0900 (6.918)	3876	-10.8200 (7.570)	4162
Length of breastfeeding (months)	-1.0910 (1.383)	2845	-0.1830 (1.425)	3724	-0.6500 (1.098)	4055
Weighed once last month for children age 0-11 months (=1)	N/A		N/A		0.4220^{***} (0.132)	471
Weighed once last month for children age 1-3 years (=1)	0.2560^{***} (0.065)	1898	0.2780^{***} (0.062)	2484	0.2310^{***} (0.057)	2715
Weighed once last month for children age 0-5 years (=1)	0.2970^{***} (0.055)	2988	0.3220^{***} (0.054)	3929	0.2810^{***} (0.049)	4171
Age appropriate vaccination (=1)	0.0386 (0.068)	2330	0.0624 (0.064)	3050	0.0212 (0.064)	3475
Completed vaccination (=1)	0.0170 (0.067)	2357	0.0389 (0.064)	3088	0.0144 (0.063)	3477
Number of Vitamin A consumed	0.2370 (0.201)	2259	0.1830 (0.196)	2950	0.1400 (0.163)	3482
Received Vitamin A twice last year (=1)	0.0454 (0.038)	2259	0.0407 (0.035)	2950	0.0230 (0.040)	3482

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Instrument: random assignment

Table 2.13: ***Cont.*** *Impact of the Program on Child Health Behaviors for Households with only 1 Child Age 0-5 Years (LATE)*

	With Covariates & Baseline Values		With Baseline Values *only*		With Covariates *only*	
	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs
Received Vitamin A twice last year (=1)	0.0454 (0.038)	2259	0.0407 (0.035)	2950	0.0230 (0.040)	3482
Child visits to traditional health facilities (freq)	-0.0014 (0.006)	4240	-0.0062 (0.007)	5558	-0.0014 (0.006)	4240
All household visits to traditional health facilities (freq)	0.0088 (0.024)	24077	-0.0019 (0.020)	31870	0.0089 (0.024)	24077
All household visits to traditional health facilities (=1)	0.0002 (0.015)	24077	-0.0028 (0.013)	31870	0.0001 (0.015)	24077
Child visits to public health facilities (freq)	0.0462 (0.031)	4240	0.0443 (0.029)	5558	0.0492 (0.031)	4240
All visits to public health facilities (freq)	0.2200^{*} (0.121)	24077	0.2760^{**} (0.118)	31870	0.2360^{*} (0.122)	24077
All household visits to public health facilities (=1)	0.1020^{*} (0.059)	24077	0.1160^{**} (0.057)	31870	0.1110^{*} (0.060)	24077
Child visits to private health facilities (frequency)	0.0188 (0.021)	4240	0.0175 (0.019)	5558	0.0178 (0.021)	4240
All household visits to private health facilities (frequency)	0.0723 (0.060)	24077	0.0860 (0.057)	31870	0.0676 (0.062)	24077
All household visits to private health facilities (=1)	0.0372 (0.036)	24077	0.0481 (0.035)	31870	0.0358 (0.036)	24077

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Instrument: random assignment

Table 2.14: *Impact of the Program on Child Health Outcomes for Households with only 1 Child Age 0-5 Years (LATE)*

	With Covariates & Baseline Values		With Baseline Values *only*		With Covariates *only*	
	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs
Weight (kg)	-0.0284 (0.208)	2558	0.0354 (0.188)	3369	-0.1810 (0.218)	3788
Weight-for-age	0.0013 (0.117)	2558	0.0071 (0.109)	3369	-0.0868 (0.118)	3788
Malnutrition (Weight-for-age $\leq$ -2)	0.0129 (0.043)	2558	0.0108 (0.039)	3369	-0.00418 (0.041)	3788
Severe malnutrition (Weight-for-age $\leq$ -3)	0.0313 (0.026)	2558	0.0337 (0.023)	3369	0.0248 (0.023)	3788
Height-for-age	-0.4280** (0.194)	2257	-0.3820** (0.189)	2984	-0.2370 (0.187)	3493
Weight-for-height	0.2820 (0.195)	2196	0.2550 (0.181)	2895	-0.0297 (0.174)	3452
Reported incidence of diarrhea (=1)	0.0488 (0.040)	3002	0.0426 (0.037)	3947	0.0239 (0.037)	4181
Treated Diarrhea (=1)	0.0093 (0.167)	189	0.0178 (0.132)	256	0.0298 (0.088)	828
Frequency of diarrhea last month	0.1280 (0.099)	2983	0.0774 (0.089)	3926	0.0420 (0.093)	4154
Length of last incidence of diarrhea (days)	0.3270* (0.179)	2985	0.2990* (0.154)	3929	0.0930 (0.174)	4155

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Instrument: random assignment

Table 2.14: ***Cont.*** *Impact of the Program on Child Health Outcomes for Households with only 1 Child Age 0-5 Years (LATE)*

	With Covariates & Baseline Values		With Baseline Values *only*		With Covariates *only*	
	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs
Reported incidence of ARI (=1)	0.0554 (0.034)	2958	0.0417 (0.031)	3888	0.0437 (0.033)	4117
Treated ARI (=1)	-0.1320 (0.351)	84	0.1240 (0.185)	110	0.0170 (0.101)	517
Reported incidence of fever (=1)	0.1310** (0.052)	3000	0.0761 (0.050)	3945	0.1130** (0.046)	4179
Reported incidence of cough (=1)	0.0476 (0.056)	3003	0.0279 (0.054)	3949	0.0519 (0.052)	4182
Incidence of cough & rapid breath (=1)	0.0509 (0.039)	2918	0.0389 (0.034)	3839	0.0321 (0.037)	4061
Reported incidence of illness (=1)	0.0649 (0.056)	3002	0.0403 (0.054)	3946	0.0644 (0.052)	4181
Mortality for age 0-28 days (=1)	-0.0046 (0.004)	4348	-0.0039 (0.003)	5674	-0.0042 (0.004)	4674
Mortality for age 1-2 months (=1)	0.0003 (0.002)	4348	0.0008 (0.002)	5674	0.0003 (0.002)	4674
Mortality for age 3-5 months (=1)	-0.0001 (0.002)	4348	-0.0010 (0.002)	5674	-0.0002 (0.002)	4674
Mortality for age 6-11 months (=1)	-0.0003 (0.002)	4348	-0.0001 (0.001)	5674	-0.0003 (0.002)	4674
Mortality for age 0-11 months (=1)	-0.0056 (0.005)	4348	-0.0050 (0.004)	5674	-0.0053 (0.004)	4674

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Instrument: random assignment

Table 2.15: *Impact of the Program on Household Expenditure for Households with only 1 Child Age 0-5 Years (LATE)*

	With Covariates & Baseline Values		With Baseline Values *only*		With Covariates *only*	
	Coef(Std. Err)	Observations	Coef(Std. Err)	Observations	Coef(Std. Err)	Observations
Total monthly expenditure per-capita (IDR)	10275.8 (11678.5)	3062	270.3 (12986.4)	4050	1007.6 (10836.0)	24077
Monthly expenditure per-capita on food (IDR)	788.6 (1709.0)	21914	225.6 (1695.0)	29056	762.7 (1763.5)	24077
Monthly expenditure per-capita on non-food (IDR)	-1948.4 (11168.5)	21914	-8787.2 (11331.7)	29056	-1474.0 (10944.7)	24077
Monthly expenditure per-capita on education (IDR)	-572.9 (2188.2)	21830	-611.4 (1879.9)	28912	-185.8 (2264.9)	23990
Monthly expenditure per-capita on health (IDR)	3139.6 (3121.1)	21909	2153.2 (3410.7)	29027	2511.6 (3012.1)	24077
Share of food expenditure on protein (percent)	0.0492 (0.233)	21907	0.194 (0.231)	29049	0.0193 (0.245)	24077

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Instrument: random assignment

Table 2.16: *Hypothesis 1: Comparison of Prior Health Behaviors with Recommended Level*

		Treatment sub-districts			Control sub-districts		
Outcome variables on child health	Recommended level	Mean	Std. errors	Obs	Mean	Std. errors	Obs
Age appropriate immunization	1 if completed, 0 otherwise	0.363[a]	0.009	2900	0.357[a]	0.009	2897
Vitamin A consumption	2 capsules per year	0.510[a]	0.009	2867	0.521[a]	0.009	2807
Child health check up visits (age 0-11 months old)	3 visits quarterly	1.882[a]	0.036	1189	1.893[a]	0.036	1219
Child health check up visits (age 1-3 years old)	1 visit quarterly	1.988[b]	0.030	1844	1.990[b]	0.030	1823

Notes: [a] significant for left tail t-test, [b] significant for right tail t-test

Table 2.17: *Hypothesis 1: Comparison of Prior Health Behaviors with Recommended Level (Urban/Rural)*

		Treatment sub-districts			Control sub-districts		
Outcome variables on child health	Recommended level	Mean	Std. errors	Obs	Mean	Std. errors	Obs
Urban							
Age appropriate immunization	1 if completed, 0 otherwise	0.365^{a}	0.010	2293	0.359^{a}	0.010	2208
Vitamin A consumption	2 capsules per year	0.507^{a}	0.011	2269	0.528^{a}	0.011	2130
Child health check up visits (age 0-11 months old)	3 visits quarterly	1.895^{a}	0.042	898	1.899^{a}	0.043	908
Child health check up visits (age 1-3 years old)	1 visit quarterly	1.983^{b}	0.033	1505	1.947^{b}	0.034	1418
Rural							
Age appropriate immunization	1 if completed, 0 otherwise	0.356^{a}	0.019	607	0.350^{a}	0.018	689
Vitamin A consumption	2 capsules per year	0.518^{a}	0.020	598	0.501^{a}	0.019	677
Child health check up visits (age 0-11 months old)	3 visits quarterly	1.842^{a}	0.075	291	1.878^{a}	0.070	311
Child health check up visits (age 1-3 years old)	1 visit quarterly	2.009^{b}	0.069	339	2.138^{b}	0.061	405

Notes: ^{a} significant for left tail t-test, ^{b} significant for right tail t-test

Table 2.18: *Hypothesis 1: Comparison of Prior Health Behaviors with Recommended Level (Java/Off-Java)*

		Treatment sub-districts			Control sub-districts		
Outcome variables on child health	Recommended level	Mean	Std. errors	Obs	Mean	Std. errors	Obs
Java							
Age appropriate immunization	1 if completed, 0 otherwise	0.364[a]	0.011	2015	0.345[a]	0.011	1998
Vitamin A consumption	2 capsules per year	0.515[a]	0.011	1985	0.516[a]	0.011	1914
Child health check up visits (age 0-11 months old)	3 visits quarterly	1.856[a]	0.043	862	1.851[a]	0.043	875
Child health check up visits (age 1-3 years old)	1 visit quarterly	2.065[b]	0.035	1222	2.097[b]	0.035	1210
Off-Java							
Age appropriate immunization	1 if completed, 0 otherwise	0.361[a]	0.016	885	0.382[a]	0.016	899
Vitamin A consumption	2 capsules per year	0.497[a]	0.017	882	0.532[a]	0.017	893
Child health check up visits (age 0-11 months old)	3 visits quarterly	1.951[a]	0.067	327	2.000[a]	0.068	344
Child health check up visits (age 1-3 years old)	1 visit quarterly	1.836[b]	0.053	622	1.778[b]	0.054	613

Notes: [a] significant for left tail t-test, [b] significant for right tail t-test

Table 2.19: *Hypothesis 1: Comparison of Prior Health Behaviors with Recommended Level (Complete Immunization for Children Age above 9 Months)*

		Treatment sub-districts			Control sub-districts		
Outcome variables on child health	Recommended level	Mean	Std. errors	Sample size	Mean	Std. errors	Sample size
BCG	1 if completed, 0 otherwise	0.872[a]	0.008	1967	0.876[a]	0.007	1968
1st Polio	1 if completed, 0 otherwise	0.887[a]	0.007	1956	0.897[a]	0.007	1954
2nd Polio	1 if completed, 0 otherwise	0.813[a]	0.009	1936	0.813[a]	0.009	1937
3rd Polio	1 if completed, 0 otherwise	0.721[a]	0.010	1929	0.733[a]	0.010	1920
4th Polio	1 if completed, 0 otherwise	0.611[a]	0.011	1921	0.598[a]	0.011	1916
1st DPT	1 if completed, 0 otherwise	0.815[a]	0.009	1924	0.816[a]	0.009	1927
2nd DPT	1 if completed, 0 otherwise	0.737[a]	0.010	1915	0.733[a]	0.010	1914
3rd DPT	1 if completed, 0 otherwise	0.672[a]	0.011	1911	0.656[a]	0.011	1911
Measles	1 if completed, 0 otherwise	0.739[a]	0.010	1939	0.753[a]	0.010	1936
1st Hepatitis B	1 if completed, 0 otherwise	0.763[a]	0.010	1928	0.770[a]	0.010	1918
2nd Hepatitis B	1 if completed, 0 otherwise	0.670[a]	0.011	1921	0.669[a]	0.011	1913
3rd Hepatitis B	1 if completed, 0 otherwise	0.610[a]	0.011	1919	0.592[a]	0.011	1901

Notes: [a] significant for left tail t-test, [b] significant for right tail t-test

Table 2.20: *Hypothesis 1: Comparison of Prior Health Behaviors with Recommended Level (Complete Immunization for Children Age above 12 Months)*

Outcome variables on child health	Recommended level	Treatment sub-districts			Control sub-districts		
		Mean	Std. errors	Obs	Mean	Std. errors	Obs
BCG	1 if completed, 0 otherwise	0.875[a]	0.008	1712	0.875[a]	0.008	1658
1st Polio	1 if completed, 0 otherwise	0.889[a]	0.008	1704	0.899[a]	0.007	1648
2nd Polio	1 if completed, 0 otherwise	0.823[a]	0.009	1685	0.817[a]	0.010	1632
3rd Polio	1 if completed, 0 otherwise	0.733[a]	0.011	1678	0.741[a]	0.011	1618
4th Polio	1 if completed, 0 otherwise	0.628[a]	0.012	1670	0.608[a]	0.012	1613
1st DPT	1 if completed, 0 otherwise	0.824[a]	0.009	1674	0.819[a]	0.010	1623
2nd DPT	1 if completed, 0 otherwise	0.747[a]	0.011	1666	0.738[a]	0.011	1613
3rd DPT	1 if completed, 0 otherwise	0.684[a]	0.011	1662	0.664[a]	0.012	1611
Measles	1 if completed, 0 otherwise	0.758[a]	0.010	1687	0.772[a]	0.010	1633
1st Hepatitis B	1 if completed, 0 otherwise	0.771[a]	0.010	1678	0.775[a]	0.010	1616
2nd Hepatitis B	1 if completed, 0 otherwise	0.683[a]	0.011	1670	0.680[a]	0.012	1610
3rd Hepatitis B	1 if completed, 0 otherwise	0.627[a]	0.012	1668	0.604[a]	0.012	1603

Notes: [a] significant for left tail t-test, [b] significant for right tail t-test

Table 2.21: *Hypothesis 1: Comparison of Prior Health Behaviors with Recommended Level (Complete Immunization for Children Age above 18 Months)*

		Treatment sub-districts			Control sub-districts		
Outcome variables on child health	Recommended level	Mean	Std. errors	Obs	Mean	Std. errors	Obs
BCG	1 if completed, 0 otherwise	0.885[a]	0.009	1203	0.881[a]	0.009	1183
1st Polio	1 if completed, 0 otherwise	0.898[a]	0.009	1197	0.906[a]	0.009	1180
2nd Polio	1 if completed, 0 otherwise	0.835[a]	0.011	1184	0.829[a]	0.011	1167
3rd Polio	1 if completed, 0 otherwise	0.745[a]	0.013	1178	0.760[a]	0.013	1157
4th Polio	1 if completed, 0 otherwise	0.646[a]	0.014	1171	0.627[a]	0.014	1154
1st DPT	1 if completed, 0 otherwise	0.830[a]	0.011	1174	0.829[a]	0.011	1161
2nd DPT	1 if completed, 0 otherwise	0.751[a]	0.013	1171	0.753[a]	0.013	1154
3rd DPT	1 if completed, 0 otherwise	0.693[a]	0.014	1167	0.689[a]	0.014	1152
Measles	1 if completed, 0 otherwise	0.784[a]	0.012	1183	0.801[a]	0.012	1169
1st Hepatitis B	1 if completed, 0 otherwise	0.782[a]	0.012	1176	0.791[a]	0.012	1156
2nd Hepatitis B	1 if completed, 0 otherwise	0.695[a]	0.013	1172	0.706[a]	0.013	1151
3rd Hepatitis B	1 if completed, 0 otherwise	0.646[a]	0.014	1171	0.636[a]	0.014	1145

Notes: [a] significant for left tail t-test, [b] significant for right tail t-test

Table 2.22: *Hypothesis 1: Comparison of Prior Health Behaviors with Recommended Level (Immunization by Age for Children Age 0-9 Months)*

		Treatment sub-districts			Control sub-districts		
Outcome variables on child health	Recommended level	Mean	Std. errors	Obs	Mean	Std. errors	Obs
0-1 month old							
1st Hepatitis B	1 if completed, 0 otherwise	0.562[a]	0.017	867	0.532[a]	0.017	893
1 month old							
BCG	1 if completed, 0 otherwise	0.781[a]	0.015	771	0.758[a]	0.015	792
1st Polio	1 if completed, 0 otherwise	0.731[a]	0.016	773	0.718[a]	0.016	788
2 months old							
2nd Polio	1 if completed, 0 otherwise	0.604[a]	0.019	647	0.602[a]	0.019	669
2nd Hepatitis B	1 if completed, 0 otherwise	0.442[a]	0.020	640	0.416[a]	0.019	668
1st DPT	1 if completed, 0 otherwise	0.667[a]	0.018	651	0.657[a]	0.018	671
3 months old							
3rd Polio	1 if completed, 0 otherwise	0.477[a]	0.021	556	0.496[a]	0.021	570
3rd Hepatitis B	1 if completed, 0 otherwise	0.349[a]	0.020	553	0.334[a]	0.020	572
2nd DPT	1 if completed, 0 otherwise	0.545[a]	0.021	554	0.556[a]	0.021	572
4 months old							
4th Polio	1 if completed, 0 otherwise	0.303[a]	0.021	468	0.318[a]	0.022	469
3rd DPT	1 if completed, 0 otherwise	0.422[a]	0.023	465	0.463[a]	0.023	471
9 months old							
Measles	1 if completed, 0 otherwise	0.363[a]	0.051	91	0.470[a]	0.050	100

Notes: [a] significant for left tail t-test, [b] significant for right tail t-test

Table 2.23: *Hypothesis 2: Summary Statistics of Health Costs at Baseline (IDR)*

	Treatment			Control		
	Mean	Std. Dev	Observations	Mean	Std. Dev	Observations
From *Puskesmas* data						
Cost for new visit	2173.8	1635.3	170	2157.7	2096.3	175
Cost for old visit	2087.1	1572.9	170	2004.3	1589.5	176
Cost for BCG vaccine	1017.8	1491.9	169	1078.9	1793.2	175
Cost for DPT vaccine	990.9	1452.0	165	1525.6	6133.2	168
Cost for Polio vaccine	973.2	1436.5	168	1010.3	1762.6	175
Cost for measles vaccine	1018.0	1430.0	167	1047.7	1532.8	174
Cost for DPT/Hepatitis B combo vaccine	1080.8	1492.6	161	1087.1	1594.8	170
Cost for Hepatitis B vaccine	1046.3	1495.1	162	1031.2	1498.9	170
Total cost for vaccine	5991.1	8595.5	169	6653.1	11098.2	175
From households data						
Cost for weighing and vitamin A on last visit	289.6	984.3	77	300.0	1348.1	69
Cost for BCG vaccine	1357.5	3374.5	428	1400.7	5503.7	448
Cost for 1st Polio vaccine	605.8	1887.4	416	1079.9	5452.9	432
Cost for 2nd Polio vaccine	698.4	2019.7	363	1090.1	5556.9	372
Cost for 3rd Polio vaccine	665.6	2031.1	302	1089.6	5982.9	307
Cost for 4th Polio vaccine	645.2	1987.4	241	1126.6	6741.2	233
Cost for 1st DPT vaccine	918.8	2470.7	357	1221.5	5641.9	377
Cost for 2nd DPT vaccine	1014.8	2623.7	305	1373.4	6263.3	312
Cost for 3rd DPT vaccine	925.3	2534.2	261	1372.7	6504.1	267
Cost for measles vaccine	1191.1	3478.3	280	1299.7	6312.3	287
Cost for 1st Hepatitis B vaccine	1320.6	4066.6	340	1524.4	6821.5	348
Cost for 2nd Hepatitis B vaccine	1132.8	3365.8	271	1543.1	6779.2	267
Cost for 3rd Hepatitis B vaccine	1160.3	3539.0	234	1627.8	7298.1	223
Total cost for vaccine	8876.3	22924.9	477	11840.5	66444.6	492

Table 2.24: *Hypothesis 3: Summary Statistics of Health Services at Baseline*

	Treatment			Control		
	Mean	St.Dev	Obs	Mean	St.Dev	Obs
From household data						
Hours needed to reach *posyandu*	0.201	0.25	1506	0.178	0.21	1378
Distance to *posyandu* (km)	0.579	1.93	1509	0.449	0.71	1373
Waiting time at *posyandu* (hour)	0.401	0.63	1499	0.371	0.53	1371
From *puskesmas* data						
Ratio of sub-*puskesmas* per household	0.005	0.01	177	0.005	0.01	178
Ratio of *posyandu* per household	0.061	0.06	177	0.059	0.04	179
Ratio of active *posyandu* per household	0.060	0.06	177	0.057	0.04	179
Current availability of Vitamin A (=1)	0.953	0.21	170	0.936	0.25	171
Current availability of BCG vaccine (=1)	0.954	0.21	173	0.989	0.11	180
Current availability of DPT vaccine (=1)	0.932	0.25	148	0.951	0.22	144
Current availability of DPT or Hepatitis B combo vaccine (=1)	0.971	0.17	170	0.977	0.15	173
Current availability of Polio vaccine (=1)	0.994	0.08	175	0.983	0.13	180
Current availability of Hepatitis B vaccine (=1)	0.970	0.17	169	0.97	0.17	167
Current availability of measles vaccine (=1)	0.994	0.08	175	0.994	0.07	179
Weeks Vitamin A was not available last month	0.280	1.00	168	0.329	1.04	170
Weeks BCG was not available last month	0.395	1.09	172	0.358	1.11	179
Weeks DPT was not available last month	0.320	1.01	147	0.289	0.94	142
Weeks DPT/Hepatitis B combo vaccine was not available last month	0.226	0.85	168	0.291	0.97	172
Weeks Polio vaccine was not available last month	0.168	0.75	173	0.257	0.94	179
Weeks Hepatitis B vaccine was not available last month	0.263	0.92	167	0.325	0.98	166
Weeks Measles vaccine was not available last month	0.173	0.78	173	0.197	0.81	178
From village data						
Active *posyandu* per household	0.006	0.02	1368	0.005	0.00	1351
Puskesmas is located in the village (=1)	13.7%		1369	14.1%		1354
Minutes needed to reach the closest *puskesmas*	17.412	33.38	1356	16.983	25.61	1343
Distance to the closest *puskesmas*	4.114	5.15	1369	4.015	4.94	1354

Table 2.25: *Hypothesis 3: Distribution of Distance to Posyandu from Households*

	Treatment	Control
All observations		
Posyandu is located in the neighborhood	40.59%	40.24%
Posyandu is located in the ward	44.84%	46.26%
Posyandu is located in the village	13.53%	12.18%
Posyandu is located outside village	1.04%	1.33%
Java		
Posyandu is located in the neighborhood	43.62%	43.76%
Posyandu is located in the ward	45.56%	46.81%
Posyandu is located in the village	9.82%	8.23%
Posyandu is located outside village	1.00%	1.20%
Off-Java		
Posyandu is located in the neighborhood	33.33%	31.46%
Posyandu is located in the ward	43.11%	44.87%
Posyandu is located in the village	22.44%	22.02%
Posyandu is located outside village	1.12%	1.66%
Urban		
Posyandu is located in the neighborhood	39.22%	38.48%
Posyandu is located in the ward	45.73%	46.85%
Posyandu is located in the village	13.91%	13.22%
Posyandu is located outside village	1.13%	1.45%
Rural		
Posyandu is located in the neighborhood	45.80%	45.59%
Posyandu is located in the ward	41.72%	44.44%
Posyandu is located in the village	11.79%	9.00%
Posyandu is located outside village	0.68%	0.96%

Table 2.26: *Hypothesis 3: LATE Estimation on Child Health Behavior*

	Ever breastfed	Waiting time for breastfed after birth	Length of breastfeeding	Weighed once last month for children age 1-3 years	Weighed once last month for children age 0-5 years	Age appropriate vaccination
Received CCT (=1)	0.010	-1.339	-1.118	0.271***	0.306***	0.009
	(0.015)	(7.402)	(1.287)	(0.070)	(0.058)	(0.068)
Index 1	-0.002	-0.951	0.101	-0.001	0.001	0.001
	(0.003)	(1.203)	(0.180)	(0.010)	(0.008)	(0.012)
Received CCT $\star$ index 1	0.005	-0.354	0.372	0.015	-0.001	-0.005
	(0.006)	(2.331)	(0.430)	(0.023)	(0.019)	(0.025)
Observations	3775	3997	3648	2284	3755	3049
Adjusted R^2	0.011	0.004	0.036	0.057	0.048	0.004
Received CCT (=1)	-	-	-	-	-	0.035
						(0.070)
Index 2	-	-	-	-	-	0.015
						(0.010)
Received CCT $\star$ Index 2	-	-	-	-	-	-0.016
						(0.025)
Observations	-	-	-	-	-	3143
Adjusted R^2	-	-	-	-	-	0.047

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$
LATE estimations with interaction variable (health supply indexes), all estimations include control variables
Instrument: random assignment and random assignment * $index_i$
Index 1: Availability of health services, Index 2: Weeks vaccine *not* available

Table 2.26: ***Cont.*** *Hypothesis 3: LATE Estimation on Child Health Behavior*

	Completed vaccination	Number of Vitamin A consumed	Received Vitamin A twice last year	Child visit to traditional health facilities	Child visit to public health facilities	Child visit to private health facilities
Received CCT (=1)	-0.003 (0.068)	0.251 (0.222)	0.035 (0.041)	0.005 (0.005)	0.081*** (0.031)	0.004 (0.020)
Index 1	0.003 (0.012)	-0.002 (0.037)	-0.002 (0.007)	0.000 (0.001)	0.003 (0.005)	-0.000 (0.002)
Received CCT ⋆ Index 1	-0.006 (0.025)	-0.011 (0.075)	-0.002 (0.014)	-0.001 (0.002)	-0.008 (0.012)	0.000 (0.006)
Observations	2953	2862	2862	4116	4116	4116
Adjusted R^2	0.047	0.024	-0.003	-0.004	0.007	0.012
Received CCT (=1)	0.024 (0.070)	-	-	-	-	-
Index 2	0.016* (0.010)	-	-	-	-	
Received CCT ⋆ Index 2	-0.017 (0.025)	-	-	-	-	-
Observations	3177	-	-	-	-	-
Adjusted R^2	0.044	-	-	-	-	-

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$
LATE estimations with interaction variable (health supply indexes), all estimations include control variables
Instrument: random assignment and random assignment * $index_i$
Index 1: Availability of health services and Index 2: Weeks vaccine *not* available

Table 2.27: *Hypothesis 3: LATE Estimation on Child Health Outcomes*

	Weight	WFA	Malnutrition (WFA ≤ -2)	Severe malnutrition (WFA ≤ -3)	HFA	WFH	Reported incidence of diarrhea	Treated Diarrhea	Frequency of diarrhea last month	Length of last diarrhea (days)
Received CCT (=1)	0.005 (0.214)	0.008 (0.114)	-0.009 (0.041)	-0.016 (0.027)	-0.244 (0.189)	0.148 (0.185)	0.059 (0.041)	0.089 (0.131)	0.140 (0.108)	0.297* (0.172)
Index 1	-0.014 (0.029)	-0.003 (0.016)	0.002 (0.006)	-0.000 (0.004)	0.060* (0.033)	-0.073** (0.032)	-0.005 (0.006)	0.010 (0.025)	0.009 (0.016)	0.001 (0.023)
Received CCT ⋆ Index 1	0.030 (0.068)	0.011 (0.038)	0.014 (0.016)	0.008 (0.009)	-0.117* (0.070)	0.145** (0.071)	-0.008 (0.014)	0.089 (0.063)	-0.029 (0.036)	-0.063 (0.054)
Observations	3175	3175	3175	3175	2800	2716	3820	232	3796	3798
Adjusted R^2	0.365	0.162	0.133	0.044	0.041	0.016	0.015	0.035	0.004	0.002
Received CCT (=1)	-0.101 (0.205)	-0.060 (0.110)	0.035 (0.041)	-0.003 (0.026)	-0.412** (0.186)	0.171 (0.186)	0.055 (0.038)	0.059 (0.143)	0.084 (0.110)	0.258 (0.172)
Index 2	-0.008 (0.036)	-0.008 (0.019)	0.006 (0.010)	0.001 (0.004)	-0.031 (0.035)	0.015 (0.030)	0.004 (0.006)	-0.009 (0.025)	0.006 (0.014)	0.010 (0.027)
Received CCT ⋆ Index 2	0.076 (0.090)	0.044 (0.050)	-0.021 (0.024)	0.004 (0.012)	0.058 (0.084)	0.039 (0.084)	-0.013 (0.015)	-0.053 (0.076)	-0.034 (0.032)	-0.068 (0.059)
Observations	3395	3395	3395	3395	2987	2906	4095	248	4070	4072
Adjusted R^2	0.359	0.166	0.137	0.043	0.046	0.028	0.015	0.027	0.005	0.005

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$
LATE estimations with interaction variable (health supply indexes), all estimations include control variables
Instrument: random assignment and random assignment * $index_i$
Index 1: Availability of health services; Index 2: Weeks vaccine *not* available; WFA: Weight-for-age; HFA: Height-for-age; and WFH: Weight-for-height

Table 2.27: ***Cont.*** *Hypothesis 3: LATE Estimation on Child Health Outcomes*

	ARI	ARI	Fever	Cough	Cough & rapid breath	Illness	Mortality (0-28 days)	Mortality (1-2 months)	Mortality (3-5 months)	Mortality (6-11 months)	Mortality (0-11 months)
Received CCT (=1)	0.049 (0.033)	-0.231 (0.323)	0.140*** (0.054)	0.052 (0.057)	0.043 (0.040)	0.089 (0.059)	-0.002 (0.003)	-0.001 (0.001)	-0.001 (0.001)	0.002 (0.002)	-0.003 (0.004)
Index 1	-0.001 (0.005)	0.067** (0.028)	-0.006 (0.008)	-0.005 (0.008)	-0.000 (0.005)	-0.005 (0.009)	-0.001*** (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.001 (0.000)
Received CCT ⋆ Index 1	-0.007 (0.013)	-0.024 (0.067)	-0.020 (0.019)	0.006 (0.021)	-0.004 (0.015)	-0.003 (0.020)	0.001 (0.001)	0.000 (0.000)	-0.000 (0.001)	-0.001 (0.001)	0.000 (0.001)
Observations	3757	103	3818	3821	3706	3820	9261	9261	9261	9261	9261
Adjusted R^2	0.004	-0.202	0.001	0.011	0.006	0.006	0.000	-0.002	-0.001	-0.001	-0.000
Received CCT (=1)	0.043 (0.032)	-0.143 (0.292)	0.122** (0.050)	0.047 (0.056)	0.038 (0.039)	0.080 (0.057)	-	-	-	-	-
Index 2	0.000 (0.005)	0.020 (0.034)	0.003 (0.008)	0.006 (0.010)	-0.001 (0.006)	0.004 (0.011)	-	-	-	-	-
Received CCT ⋆ Index 2	-0.006 (0.011)	-0.011 (0.088)	-0.002 (0.019)	-0.009 (0.023)	-0.003 (0.015)	-0.004 (0.024)	-	-	-	-	-
Observations	4030	108	4094	4097	3976	4095	-	-	-	-	-
Adjusted R^2	0.006	-0.129	0.008	0.014	0.007	0.012	-	-	-	-	-

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$
Instrument: random assignment and random assignment * $index_i$
LATE estimations with interaction variable (health supply indexes), all estimations include control variables
Index 1: Availability of health services and Index 2: Weeks vaccine *not* available

Table 2.28: *Hypothesis 4: IV Estimation of Child Health Behaviors on Child Health Outcomes*

	Health Behavior Index		Growth Monitoring		Vitamin A Consumption		Complete Vaccination	
	Coef(St.Err)	Obs	Coef(St.Err)	Obs	Coef(St.Err)	Obs	Coef(St.Err)	Obs
Weight (kg)	-0.321	5426	-0.132	5393	-6.367	4602	0.546	4455
	(1.767)		(0.802)		(19.69)		(8.155)	
Weight-for-age	-0.0452	5426	-0.0177	5393	-1.965	4602	-2.871	4455
	(0.879)		(0.404)		(6.610)		(6.857)	
Height-for-age	-1.380	5007	-0.626	4978	-4.376	4248	-23.90	4103
	(1.352)		(0.618)		(5.554)		(87.06)	
Weight-for-height	0.247	4932	0.0791	4900	2.121	4198	7.088	4054
	(1.322)		(0.582)		(17.57)		(29.05)	
Malnutrition	-0.123	5426	-0.0631	5393	-0.515	4602	0.276	4455
(Weight-for-age $\leq$ -2)	(0.299)		(0.136)		(2.331)		(1.452)	
Severe malnutrition	-0.0649	5426	-0.0240	5393	-0.553	4602	0.437	4455
(Weight-for-age $\leq$ -3)	(0.174)		(0.0798)		(1.613)		(1.202)	
Reported incidence	0.349	6100	0.164	6063	1.731	5085	1.500	4978
of diarrhea (=1)	(0.294)		(0.125)		(2.708)		(3.921)	
Length of last incidence	1.335	6055	0.629	6020	9.045	5043	4.234	4939
of diarrhea (days)	(1.302)		(0.553)		(17.37)		(11.86)	

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Instrument: random assignment, all estimations include control variables
Health Behavior Index: share of required behaviors (growth monitoring, Vit. A consumption, and vaccination) fulfilled by households

Table 2.28: ***Cont.*** *Hypothesis 4: IV Estimation of Child Health Behaviors on Child Health Outcomes*

	Health Behavior Index		Growth Monitoring		Vitamin A Consumption		Complete Vaccination	
	Coef(St.Err)	Obs	Coef(St.Err)	Obs	Coef(St.Err)	Obs	Coef(St.Err)	Obs
Frequency of diarrhea last month	0.129	6055	0.0647	6019	1.898	5043	1.312	4940
	(0.679)		(0.306)		(5.226)		(4.864)	
Treated diarrhea (=1)	1.042	1223	0.640	1215	0.799	1036	0.996	984
	(1.130)		(0.629)		(1.762)		(2.573)	
Reported incidence of ARI (=1)	0.224	5999	0.105	5963	1.114	4996	1.658	4895
	(0.231)		(0.101)		(2.029)		(5.176)	
Treated ARI (=1)	-0.205	711	-0.123	702	24.98	602	1.970	574
	(1.364)		(0.474)		(1142.4)		(4.578)	
Reported incidence of fever (=1)	0.858**	6099	0.404**	6062	4.202	5084	4.312	4977
	(0.402)		(0.159)		(5.738)		(9.504)	
Reported incidence of cough (=1)	0.299	6102	0.148	6065	1.189	5086	2.463	4980
	(0.384)		(0.171)		(2.432)		(6.033)	
Incidence of cough & rapid breath (=1)	0.116	5926	0.0549	5890	0.365	4932	1.421	4831
	(0.256)		(0.116)		(1.227)		(4.141)	
Reported incidence of illness (=1)	0.626	6100	0.295*	6063	3.354	5085	3.702	4978
	(0.427)		(0.177)		(4.899)		(9.013)	

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Instrument: random assignment, all estimations include control variables
Health Behavior Index: share of required behaviors (growth monitoring, Vit. A consumption, and vaccination) fulfilled by households

Table 2.29: *Hypothesis 4: Correlation of Child Health Outcomes and PKH Program's Required Child Health Behavior (Only PKH Households)*

	Health Behavior Index		Growth Monitoring		Vitamin A Consumption		Complete Vaccination	
	Coef(Std.Err)	Obs	Coef(Std.Err)	Obs	Coef(Std.Err)	Obs	Coef(Std.Err)	Obs
Weight (kg)	2.818^{***}	1638	0.788^{***}	1625	2.376^{***}	1409	0.771^{***}	1381
	(0.288)		(0.272)		(0.197)		(0.149)	
Weight-for-age	-0.556^{***}	1638	-0.448^{***}	1625	-0.312^{***}	1409	-0.116^{*}	1381
	(0.113)		(0.0889)		(0.0879)		(0.0679)	
Height-for-age	-0.855^{***}	1511	-0.553^{***}	1499	-0.743^{***}	1302	-0.111	1263
	(0.212)		(0.161)		(0.155)		(0.116)	
Malnutrition	0.105^{***}	1638	0.104^{***}	1625	0.0611^{*}	1409	0.0167	1381
(Weight-for-age $\leq$ -2)	(0.0365)		(0.0294)		(0.0313)		(0.0231)	
Reported incidence	0.0123	1863	0.0498^{**}	1850	-0.0289	1577	-0.0278	1552
of diarrhea (=1)	(0.0300)		(0.0235)		(0.0241)		(0.0218)	
Length of last incidence	0.0261	1844	0.198^{*}	1832	-0.160	1560	-0.0445	1535
of diarrhea (days)	(0.141)		(0.106)		(0.102)		(0.0910)	
Reported incidence	0.0362^{*}	1828	0.0534^{***}	1816	0.0144	1548	-0.0106	1522
of ARI (=1)	(0.0214)		(0.0178)		(0.0172)		(0.0174)	
Reported incidence	0.0762^{**}	1862	0.0687^{**}	1849	0.0187	1576	0.0226	1551
of fever (=1)	(0.0374)		(0.0283)		(0.0297)		(0.0249)	
Reported incidence	0.0177	1863	0.0690^{**}	1850	0.0298	1577	-0.0474^{*}	1552
of cough (=1)	(0.0378)		(0.0303)		(0.0311)		(0.0261)	
Incidence of cough	0.0172	1810	0.0376^{*}	1798	0.0115	1532	-0.0100	1507
& rapid breath (=1)	(0.0272)		(0.0217)		(0.0212)		(0.0207)	
Reported incidence	0.0514	1862	0.0764^{***}	1849	0.00754	1576	-0.00635	1551
of illness (=1)	(0.0356)		(0.0294)		(0.0301)		(0.0261)	

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
OLS estimations on child health outcomes, all estimations include control variables
Health Behavior Index: share of required behaviors (growth monitoring, Vit. A consumption, and vaccination) fulfilled by households

Table 2.30: *Hypothesis 5: LATE Estimation of Impact of Program on Child Food Consumption, Adult's Expenditure and Outpatient Visits*

	Days of protein consumption	Days of fiber consumption	Days of carbohydrate consumption	Days of processed food consumption	Expenditure on alcohol, per capita	Expenditure on cigarettes, per capita	Child visits to public health facilities (freq)	Child visits to private health facilities (freq)	Adult visits to public health facilities (freq)	Adult visits to private health facilities (freq)
All sample										
Received CCT (=1)	-0.037	-0.039	-0.048	-0.003	10.003	-341.373	0.082***	0.009	0.104**	0.018
	(0.050)	(0.107)	(0.082)	(0.064)	(54.775)	(339.251)	(0.024)	(0.016)	(0.042)	(0.028)
Obs	5023	5023	5023	5023	58076	58065	6421	6421	34033	34033
Adj. R^2	0.016	0.010	0.032	0.049	0.032	0.063	0.005	0.010	0.060	0.028
Only for households with one child age 0-5 years old										
Received CCT (=1)	-0.170	0.144	0.009	0.012	-13.086	24.099	0.049	0.018	0.102	0.049
	(0.101)	(0.239)	(0.171)	(0.139)	(67.838)	(459.390)	(0.031)	(0.021)	(0.063)	(0.041)
Obs	592	592	592	592	21899	24077	4240	4240	13943	13943
Adj. R^2	0.011	0.047	0.035	0.077	0.054	0.057	0.009	0.007	0.034	0.033

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Instrument: random assignment, all estimations include control variables

Table 2.31: *Hypothesis 5: Comparison of Expenditure Data between SUSENAS and CCT*

Variable	Susenas Data			CCT data		
	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs
2007						
Monthly food expenditure (IDR)	726,607.5	421391.0	285186	161,052.0	89676.6	71960
Monthly non-food expenditure (IDR)	504,337.4	666274.0	285186	338,984.3	793244.9	71960
Monthly total expenditure (IDR)	1,230,945.0	948134.6	285186	934,663.1	527960.3	71960
2009						
Monthly food expenditure (IDR)	956,869.9	576925.2	291753	206,513.4	113967.2	77836
Monthly non-food expenditure (IDR)	737,692.7	1037757.0	291753	501,015.4	891408.8	77836
Monthly total expenditure (IDR)	1,694,563	1429479.0	291753	1,254,481.0	686922.2	77836

SUSENAS: National Socio-economic Survey.

Table 2.32: *Hypothesis 6: Correlation of Required Behaviors and PKH Receipt*

	Months since last PKH transfer	Frequency of PKH transfer last year	Value of last PKH transfer (IDR)
	Coef.(Std. Err.)	Coef.(Std. Err.)	Coef.(Std. Err.)
Growth monitoring (=1)	0.871**	-0.086	2194.700
	(0.366)	(0.232)	(11160.304)
Consumed Vit. A twice (=1)	-0.302	0.116	14425.776
	(0.434)	(0.171)	(11326.768)
Age appropriate vaccination (=1)	-0.660**	-0.063	7493.189
	(0.319)	(0.165)	(9604.102)
Observations	1326	1300	1326
Adjusted R^2	0.012	0.044	0.182

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

OLS estimation on program's required behavior; all estimations include control variables

Table 2.33: *Hypothesis 7: Who Collected PKH Transfers?*

	Freq	Percent
PKH Transfer is collected by mothers	16562	73.59
PKH Transfer was *not* collected by mothers	5943	26.41

Table 2.34: *Hypothesis 7: Correlation of Household Characteristics and Collection of Transfer by Mothers*

	Transfer is collected by mothers
Mother's decision-making power (pct)	0.001^{***}
	(0.000)
Number of children age 0-5 years old	0.082^{*}
	(0.045)
Distance to nearest post office (km)	-0.007^{***}
	(0.001)
Log per cap1ta expenditure	0.055^{*}
	(0.029)
Farming household (=1)	-0.111^{***}
	(0.025)
Has parabole antenna (=1)	-0.189^{*}
	(0.113)
Familiar with chairman of regional parliament/ward committee	0.039^{*}
	(0.023)
Participated in production group (=1)	-0.132^{**}
	(0.058)
Participated in mass/political organization (=1)	0.128^{**}
	(0.061)
Has health insurance for poor (*askeskin*)	-0.055^{***}
	(0.021)
Observations	10670
Adjusted R^2	0.205

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
OLS estimation on transfer is collected by mother variable; control variables includes those used for LATE estimations

Table 2.35: *Hypothesis 7: Correlation of Collection of Transfer by Mothers and Child Health Behavior*

	Ever breastfed	Waiting time for breastfed after birth	Length of breastfeeding	Weighed once last month	Weighed once last month	Weighed once last month	Age appropriate vaccination	Completed vaccination	Received Vitamin A twice last year
Transfer is collected by the mother (=1)	0.008	5.274**	0.743	-0.019	0.032	0.002	0.002	-0.001	-0.024
	(0.009)	(2.605)	(0.711)	(0.086)	(0.034)	(0.030)	(0.040)	(0.040)	(0.026)
Obs	1865	1912	1824	202	1108	1856	1553	1555	1578
Adj. R^2	-0.004	0.006	0.081	-0.060	0.023	0.017	0.021	0.032	0.034

	Child visits to traditional health facilities (freq)	Adult visits to traditional health facilities (freq)	Adult visits to traditional health facilities (=1)	Child visits to public health facilities (freq)	Adult visits to public health facilities (freq)	Adult visits to public health facilities (=1)	Child visits to private health facilities (freq)	Adult visits to private health facilities (freq)	Adult visits to private health facilities (=1)
Transfer is collected by the mother (=1)	0.003	0.005	0.002	-0.039*	-0.068	-0.022	0.015	0.029	0.006
	(0.002)	(0.011)	(0.008)	(0.023)	(0.065)	(0.026)	(0.011)	(0.028)	(0.019)
Obs	1940	9760	9760	1940	9760	9760	1940	9760	9760
Adj. R^2	-0.003	0.013	0.022	0.005	0.118	0.099	0.010	0.037	0.036

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

OLS estimation of transfer is collected by mother variable on child health behaviors; all estimations include control variables

Table 2.36: *Hypothesis 7: Correlation of Collection of Transfer by Mothers and Child Health Outcomes*

	Weight	WFA	Malnutrition	Severe malnutrition	HFA	WFH	Incidence of diarrhea	Treated Diarrhea	Freq of diarrhea last month	Length of last diarrhea	ARI
Transfer is collected by the mother (=1)	0.121 (0.210)	0.014 (0.109)	0.003 (0.029)	-0.002 (0.016)	0.092 (0.134)	-0.049 (0.150)	0.019 (0.026)	-0.055 (0.067)	0.054 (0.051)	-0.015 (0.095)	0.042* (0.022)
Obs	1638	1638	1638	1638	1511	1489	1864	379	1843	1845	1829
Adj. R^2	0.164	0.040	0.022	0.010	0.015	0.003	0.020	0.003	0.026	0.031	0.004

	Treated ARI (=1)	Incidence of fever (=1)	Incidence of cough (=1)	Incidence of cough & rapid breath (=1)	Incidence of illness (=1)	Mortality for age 0-28 days (=1)	Mortality for age 1-2 months (=1)	Mortality for age 3-5 months (=1)	Mortality for age 6-11 months (=1)	Mortality for age 0-11 months (=1)
Transfer is collected by the mother (=1)	0.038 (0.080)	0.051 (0.031)	0.017 (0.036)	0.050** (0.025)	0.045 (0.036)	-0.001 (0.002)	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.002)	-0.001 (0.003)
Obs	216	1863	1864	1811	1863	3137	3137	3137	3137	3137
Adj. R^2	0.028	0.007	0.004	0.001	0.005	-0.002	-0.002	-0.000	-0.005	-0.003

Standard errors, clustered at sub-district level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

WFA: Weight-for-age; HFA: Height-for-age; and WFH: Weight-for-height

OLS estimation of transfer is collected by mother variable on child health outcomes; all estimations include control variables

Chapter 3

Economic Crisis and Early Childhood Cognitive Development in Indonesia

3.1 Introduction

After three decades of strong economic growth, Indonesia was hit by a currency crisis in mid-1997 that escalated into financial, economic and political crisis by early 1998. Because of the crisis, the economy contracted by 14 percent, while domestic prices increased by 78 percent (Sumarto and Bazzi, 2011). The impacts of the crisis were felt mostly through decreases in real wages and a massive increase of the prices of basic goods (see Figure 3.1) (Sumarto and Bazzi, 2011). The national poverty rate increased to 33 percent by the end of 1998 from its initial rate of 15 percent in mid-1997. In the aftermath of the crisis, various studies were conducted to assess its impacts on the country, including its impacts on household health behaviors and outcomes. The research noted a significant decrease in households' health expenditure and health care utilization (Block et al., 2004; Strauss et al., 2004; Thomas and Frankenberg, 2007; Waters et al., 2003). However, most research finds little impact of the crisis on health outcomes (Block et al., 2004; Frankenberg et al., 1999; Strauss et al., 2004).

This study will examine the impact of the 1997 Asian financial crisis on child cognitive development in Indonesia using the 2007 and 2014 Indonesian Family Life Survey data which, to the knowledge of the author, has yet to be examined.

Most research on the impacts of the crisis on child health focuses on several common measures of child health, such as weight-for-height, Vitamin A consumption, and reported incidence of illness. Furthermore, most of these studies focus on short -term impacts or do not focus on young children, who were the most vulnerable to the impacts of the crisis. This study, thus, differs from the previous research due to its specific focus on early childhood development (birth to eight years old; see UNESCO (UNESCO) and Raikes et al. (2014)) and its attempt to examine whether the economic crisis has a medium term impact on the development of children's cognitive skills.

This study is motivated by research showing that there is sensitive periods in child development that influences children's development later in life. For example, a study by Knudsen et al. (2006) showed that some skills are more productively acquired at a certain period of childhood. Cunha and Heckman (2007) in particular argue that the productivity of parental investments will be higher in a child's early stages of life for cognitive skills, relative to later year investments. The opposite is argued for non-cognitive skills. Thus, given these sensitive periods, in addition to the fact that these abilities are influenced by both genetic and environmental components, a massive crisis like the 1998 financial crisis in Indonesia may have had long-run deleterious impacts on Indonesian children's cognitive development. These impacts may have lasting consequences on the later life outcomes of these children.

Although the crisis is colloquially called an economic or financial crisis, the crisis in Indonesia actually consisted of three separate, but interacting, processes (Block et al., 2004). The origin of the crisis was the currency crisis, which deepened into a full-blown financial crisis with regional and national ramifications.

As the crisis deepened, a national political crisis occured resulting in the ousting of the then incumbent president. Amidst this economic and political chaos, most rural areas in Indonesia also experienced drought due to *El Niño*-Southern Oscillation (ENSO) events that hit Indonesia before and during the financial crisis. Thus, although this chapter will refer the crisis as an economic or financial crisis, this term should be understood as including all three phenomena.

The rest of this study is organized as follows. The next section provides a review of the existing literature on child development. This will be followed by a brief historical examination of the economic crisis and its impacts in Indonesia. The next section describes the empirical strategy, which includes both the data description and the identification strategy for estimation. The last two sections present the findings and conclusions of the research.

3.2 Literature Review

Grantham-McGregor et al. (2007) made a conservative estimate that more than 200 million children in developing countries faltered in their cognitive development due to socioeconomic causes: poverty, disease, malnutrition and inadequate care. Because human capital, which includes both cognitive and non-cognitive skills, is a strong determinant of welfare outcomes in adulthood, this fact has far-reaching consequences into the future for developing countries. Thus, early childhood parental investments are important to ensure that children reach their potential.

Child development research has highlighted several important factors influencing the formation of human capital (Cunha and Heckman, 2007). Although genetic endowments matter, skills are also influenced significantly by environmental conditions. Thus any skill is shaped by both genetic and acquired factors. Because there are sensitive periods in child development, skill gaps open up at early ages, for both cognitive and non-cognitive skills. Thus, investment in early childhood has an important role in breaking the intergenerational transmission of poverty (Helmers and Patnam, 2011; Lam and Duryea, 1999; Rosenzweig and Wolpin, 1994).

Different types of ability appear to be malleable at different ages in humans. For example, IQ scores appears to become stable at age 10 (Hopkins and Bracht, 1975). This implies that the later remedial measures are given to disadvantaged children, the less effective they will be (Cunha and Heckman, 2007). Research by Nelson et al. (2007) using a randomized control trial (RCT) method to compare the cognitive skills between abandoned children reared in institutions with those who were placed in institutions but then moved to foster care show that those children who were moved to foster care have higher cognitive skills than those who remained in an institution. Furthermore, the better cognitive outcomes are most pronounced among children who were moved to foster care at the youngest ages. This, again, suggests that there are sensitive periods in cognitive development. Because there is a sensitive time for ability formation, human capital investments in early life will be more productive or cost efficient than the same investments in later life (Bärnighausen et al., 2008; Cunha and Heckman, 2007; Horton et al., 2008). However, early remedial or investments need to be followed up with later investments to sustain their impacts on the development of children's skills (Cunha and Heckman, 2007).

Poverty is considered to be the main hindrance for human capital development, and poor children have been observed to have not only lower physical health status, but also lower psychosocial and cognitive outcomes (Bradley and Corwyn, 2002; Sameroff et al., 1993). Walker et al. (2004) argue that there are three functional domains in early childhood for skill acquisition: cognitive skills, non-cognitive skills and motor development. Children in developing countries are subject to various major risks that affect their development in these three domains: stunting; iron-deficiency; iodine deficiency; lack of cognitive stimulation; intrauterine growth restriction; and maternal depression (Walker et al., 2004). Within these already less than ideal conditions, an economic crisis can further hinder childhood skill formation in developing countries through nutritional (e.g. lower food quality) and environmental (e.g. maternal stress or lower quality of public health services) pathways.

Despite the possible harmful impacts of a crisis on human capital formation, the impacts of crises on child health are still not well understood, as the impacts can be accentuated or dampened by other factors, e.g. the extent of government support to help households overcome the crisis. Most research examining the impacts of crises on child health focus on the role of nutrition. Frankenberg et al. (1999), Block et al. (2004), and Stillman and Thomas (2008), found that macroeconomic shocks had a negative impact on nutritional and health outcomes. Nevertheless, Stillman and Thomas (2008) provide evidence that the nutritional status of children in Russia is not vulnerable to short-term fluctuations in income. However, it is vulnerable to long-term fluctuations in income. Comparatively, Frankenberg et al. (1999) and Cameron (2001) found that the Indonesian economic crisis had little influence on children's health outcomes. In contrast, research by Block et al. (2004), focusing on children under 5 years old, find more pronounced negative impacts on child health outcomes. These differences could be attributed in both different data sets used and differences in the age-group considered.

Similarly, longer term impacts of the crisis are also a subject of current debate. Duncan et al. (1994) and McLoyd (1998) argue that the deleterious impact of crises on early child development in the U.S. is mostly due to persistent, rather than transitory, poverty that is caused by a crisis. Because a crisis is usually a temporary phenomenon, it is unclear whether temporary shocks can have longer-term impacts in later periods of the children's life. However, some studies appear to suggest that this is the case. One of the most recent studies examining the medium-term impact of crises on child development is that of Hidrobo (2014). The study estimates the impact of the 1998-2000 Ecuadorian economic crisis on children who were three years old or younger during that crisis. The study compares sibling differences in the outcomes of interest (height-for-age and vocabulary test scores) between households exposed to the crisis and those not exposed to the crisis. Three major pathways for the crisis were also proposed by the author: real-income reduction, child-care time reduction, and a lower quality health environment.

Building on the existing literature, this study will examine the impact of the 1997-1998 crisis on children's cognitive skills in Indonesia. As mentioned above, there have been many studies examining the impacts of income shocks and child health in Indonesia, with conflicting results (Bhutta et al., 2009; Block et al., 2004; Cameron, 2001; Frankenberg et al., 1999; Giles and Satriawan, 2015; Mani, 2012; Strauss et al., 2004; Thomas and Frankenberg, 2007; Waters et al., 2003). However none of these studies examines the impact of the crisis on Indonesian children's cognitive development, and most of these studies focus on the short-term impacts of the crisis. There have been very few studies that examine child cognitive development in Indonesia due to the paucity of cognitive skills data. One exception is the study of Cheung (2006), who uses zero-inflated binomial and beta-binomial statistical models to examine the impact of growth status at infancy and at age 7 years on cognitive function. Although the study uses Indonesian Family Life Survey (IFLS) data of the period before and after the crisis (IFLS 1997 and IFLS 2000), it generally ignores the financial crisis in the analysis. Thus, in contrast to this existing literature on Indonesia, this study will use IFLS data to examine the impact of the crisis specifically on child cognitive behaviors, which thus far has not been done for the case of Indonesia.

3.3 The Anatomy of Economic Crisis in Indonesia

The Indonesian economic crisis came as a surprise as, prior to the crisis, most economic indicators looked promising and stable (Hill, 2000). Furman et al. (1998) show that among 34 case studies, the Indonesian economic crisis was the least predictable. The impact of the crisis was felt throughout the country, and the crisis brought an end to three decades of strong economic growth averaging to almost 5.5 percent per year from 1990 until the crisis (Ahuja, 1997). The crisis also brought to a halt massive improvement in the poverty rate (which declined from 40 percent in 1976 to 18 percent in 1996), the primary school enrollment rate (which increased from 75 percent in 1970 to universal enrollment by 1995), the secondary enrollment rate (which increased from 15 percent in 1970 to 55 percent by 1995), and the total fertility rate (which fell from 5.6 in 1971 to 2.8 in 1997) (Strauss et al., 2004).

The chronology of the Indonesian economic crisis started from liquidity flight from Thailand and the depreciation of its currency by more than 50 percent (Waters et al., 2003). As the confidence in the economies of the region plummeted, Indonesia's currency, the Rupiah, depreciated by over 500 percent from January to July 1998 (Ramesh, 2009). The crisis has also caused the inflation to rise to 78 percent with unemployment rate above 6 percent in 1999 (Ramesh, 2009). As the economic conditions deteriorated, the fiscal austerity imposed on Indonesia as a condition for a bail-out by the IMF[1] created a ripple effect that turned into a massive political and social unrest (Ramesh, 2009; Sharma, 2010). In May 21st, 1998, the incumbent president, Suharto, resigned from his presidency after thirty-two years in power. The new government, under the leadership of the previous vice-president, B.J. Habibie, started several reform measures immediately, including decentralization of Indonesia's political and economic power. By the first quarter of 1999, the Indonesian economy began to recover slowly, and finally showed a positive growth rate in 2000 of around 4.5 percent (Strauss et al., 2004).

Even though the impacts of the crisis were felt by the majority of the population, different groups were affected differently. For most households, much of the impacts are due to increase in prices of basic goods and reductions in real wages (Strauss et al., 2004; Sumarto and Bazzi, 2011). With respect to health outcomes, research shows that the impact of the crisis has been relatively small (Block et al., 2004; Cameron, 2001; Frankenberg et al., 1999; Strauss et al., 2004; Thomas and Frankenberg, 2007). Regarding child health impacts, the relatively small impact is often attributed to household consumption smoothing efforts and government policy in response to the crisis (Giles and Satriawan, 2015). Table 3.1

[1]The social protection program was not included in the aid package from IMF and the World Bank until June 1998, a year after the beginning of the crisis (Ramesh, 2009)

provides an illustration of the scale of social safety net program in Indonesia during the crisis. These programs were generally targeted for the poor (Ramesh, 2009; Sumarto et al., 2008).

Although research generally shows that there have been relatively small impacts of Indonesia's 1998 crisis on child health outcomes, as discussed above, most of this research focuses on short term impacts or does not focus on very young children (Block et al., 2004; Frankenberg et al., 1999; Strauss et al., 2004). Another common research focus is to examine the role of government policy in dampening the impacts of the crisis on households. This research thus, differs from any of the above by its focus on the medium-term impacts of crisis on children's cognitive skills.

3.4 Empirical Strategy

3.4.1 Data

The data that will be used in this paper come from the 1997, 2007 and 2014 rounds of the longitudinal Indonesia Family Life Survey (IFLS2, IFLS4 and IFLS5, respectively). Starting from IFLS3, in the year 2000, specific questions on child cognitive skills were added. Using a test that was designed by two members of the testing division at the Ministry of Education, 17 questions on child cognitive skills were added (Frankenberg and Thomas, 2000). These questions were given only to children age 7 to 14 years old. The 17 questions consist of 12 questions on basic cognitive skills (for example: matching pictures) and 5 questions on basic math skills. Some children refused to answer some questions, in particular the math questions. To address this missing values problem, the following rule is applied. First, if the child answered *none* of the 17 questions, the test scores values for that child will be missing for all 17 questions. However, if the child answer some but missing for the rest, the questions that have missing values will be scored as zero. Less than 10 percent of children in the sample has missing values, thus this treatment of missing values is unlikely to create bias in the results.

The timing of the crisis and the structure of the data are critical for the identification of the impact of the crisis on child cognitive skills. First, because the test scores are available only for children age 7-14 years old in any of IFLS rounds except for the most recent one (IFLS5), the sample can include only children of that age. Second, due to the focus of this study on early childhood development, it will focus on children who were between 0 to 5 years old during the crisis year (1997). These children were thus between 10 to 15 years old in 2007. Considering the two available data and the focus of the study, the sample will thus include only children age 7 to 14 years old in both IFLS (2007 and 2014) rounds.[2] The panel nature of the data will be exploited for identification using mother fixed effects as explained in detail in the next sub-section. This results in 6676 children age 7 to 14 years in 2007 and 8159 children of that age in 2014. Thus, the comparison will be made between of siblings within this age range of 7 to 14 years old.

The main variable of interest is the number of months a child was exposed to the crisis. In order to determine this exposure length, the start and end of the crisis needs to be defined. The crisis period is defined using two sources: the data

[2]Although the focus is on children most affected by the crisis, who were 10 to 14 years old in 2007, additional children who are somewhat younger are also included to increase the sample size. These additional children were not directly affected by the crisis, but they provide valuable ”counterfactual” information precisely because they were not affected

and the literature. Figure 3.2 shows that real GDP started its massive decline in the third quarter of 1997. Although real GDP started to increase in 1999, it was not until the first quarter of 2000 that the growth was consistently above zero. The literature also generally agrees that the crisis period was between the third quarter of 1997 and the first quarter of 2000 (Hill, 2000; Ramesh, 2009; Sharma, 2010). This study will thus use the period from August 1997 to December 1999 as the crisis period. The crisis exposure period will include the time exposed while in utero. The IFLS data includes questions to mothers on weeks of pregnancy that each child has before birth. Thus children in the data may be born after different months in utero. On average children were born after 9 months of pregnancy. Using this information, a child born in December 1999 would have been exposed to the crisis for 10 months if the child was in utero for 9 months (one month after birth and 9 months in utero); but the child would have been exposed to the crisis only for 7 months if he/she was born after only 6 months of pregnancy. Similarly, a child born in March 1998 would have been exposed to the full 29 months of the crisis if he/she was born after 9 months of pregnancy (20 months after birth and 9 months in utero), but the child would have been exposed to the crisis for around 27 months if he/she was born after only 7 months of pregnancy. The next section will discuss the identification strategy that will use this variable in the estimations.

3.4.2 Identification Strategy

Following Hidrobo (2014), the variable of interest in the main specification is months exposed to the crisis. The longer the child is exposed to the crisis, the larger impact on child cognitive outcomes should be. Specifically, the estimating equation is:

$$Y_{imta} = \beta_0 + \beta_1 L_t + \alpha_0 t + \alpha_1 t^2 + \sum_{p=1}^{21} \alpha_p t * prov_p + \delta X_{imta} + \theta_m + \eta_a + \epsilon_{imta} \quad (3.1)$$

where Y_{imta} denotes the outcome variable (cognitive skills) for child i with mother m born at time t whose current age is a. The main variable of interest is L_t: the length of time that a child born at time t is exposed to the crisis. Note that L_t includes months in utero a child is exposed to the crisis. The other variables in equation (1) are: X_{imta} is vector of child characteristics, t is the date when the child was born (in months) to capture general trends in child development overtime, which is also interacted with the province variable, $prov$, to allow the time trend to vary by provinces, θ_m is a mother fixed-effect, η_a is the current age (in months) fixed effect, and lastly ϵ_{imta} is the error term. The inclusion of the mother fixed effect limits the sample to include only children with siblings who were within the early childhood range (0 to 3 years old) when they were exposed to the crisis. The mother fixed effect is included to account for unobserved time-invariant community level characteristics and unobserved time-variant household characteristics that affect child development. This implies that the error terms represent unobserved individual child characteristics and time-variiying households and community characteristics. The estimates of crisis impacts, β_1, will be unbiased only if the error term, ϵ_{imta}, is uncorrelated with the length of exposure to the crisis, L_t. The error term will be clustered at the birth-month cohort, to account for correlation within cohorts.

The challenge in identification for the above specification is to separate the crisis impacts from secular time trends. In particular, improvements in medicine and technology over time benefit younger children more than older ones. Thus, an apparent worse outcomes in older children may not necessarily be caused by the crisis. This is why the estimation specification in equation (1) includes a general quadratic time trend for the child's date of birth (in months), t, and province-level linear time trends of the child's date of birth, $t * prov_p$. The effect of the age of the child on cognitive skills is specified very flexibly using age in months fixed effects. Table 3.2 shows how the data of both birth month and exposure variables. Note that birth month was labeled such that the oldest child birth month (those that were born in January 1993) will be assigned a value of 1, and the youngest child's birth month (those that were born in July 2008) is 187. Similarly, because households most affected by the crisis may react differently, the estimations also include a mother fixed effect to control for unobservable time-invariant household characteristics, such as preferences.

The impact of the crisis is identified through comparisons of siblings with the same gap in ages across different households. In order to do this, data from two different survey rounds are needed that include children with the same age gap. If estimates were based on a single cross-section data set, it would not be possible to distinguish between date of birth and current age. But this is possible because all estimates include data from both 2007 and 2014. The inclusion of mother fixed effects restricts the comparison to be made to within-household sibling differences across different households.

Table 3.3, adapted from Hidrobo (2014), illustrates the identification channels. The estimates can be identified through two channels. The first channel is through comparison of sibling pairs in household 1 and household 2 in the first four rows of Table 3.3. More specifically, the two households' sibling differences are compared, i.e. the sibling differences of household 1 for the survey month

January 2007 are compared with the siblings differences in household 2 in survey month January 2014. Both households have siblings with the same age gap, but they differ in exposure (in months) to the crisis because they were surveyed in different years, specifically the 97 month old child in 2007 in household 1 had been exposed to the crisis for around 12 months, while a child of the same age (97 months) in 2014 was never exposed to the crisis. In the absence of the crisis, and assuming that a relatively linear date of birth time trend of early childhood development, the cognitive skills differences of siblings in household 1 should be the same with the cognitive skills differences of siblings in household 2. Thus the estimates are identified because, although both households have siblings with the same age gap, the older child in household 1 was exposed to the crisis while the older child in household 2 was not.

The second channel compares households 3 and 4. The sibling differences this time are identified through two different survey dates. The sibling differences within both household 3 and 4 are calculated by using data collected in two different years. Consider household 3, the siblings are of the same age in two different years (2007 and 2014). The first child was exposed to the crisis when he/she was between 0 to 97 months. However, the second child never experienced any crisis when he/she was between 0 to 97 months old. For household 4 both children never experienced the crisis when they were both between age 0 to 73 months old. The age gap of the siblings is the same (84 months) for both households. Without the crisis, the gap in cognitive skills between siblings of these two households should be the same. The crisis, however, may increase/decrease the sibling differences in household 3. Thus the crisis impact can be identified by comparing the differences in cognitive achievement of the siblings of the same age (but of different points in time) in household 3 with the same differences of siblings' cognitive achievement in household 4.

As mentioned in the previous paragraphs, this identification strategy requires that the differences in siblings of the same age be the same across households in the absence of economic crisis, i.e. in the absence of a crisis, the differences in cognitive skills of siblings in household i whose age gap is 5 years should be the same as the differences in cognitive skills of siblings in household j whose age gap is *also* 5 years. This assumption will hold if the time trend of early childhood development is generally linear. Given that infant mortality and weight-for-age time trends in Indonesia are relatively linear, this assumption is likely hold (see Figures 3.3 and 3.4). Another threat to the identification is that if there is a deviation from the trend that is caused by other shocks not related to the crisis, such as unconditional and conditional cash transfer programs (UCT and CCT programs), which started in 2005 and mid 2007 in Indonesia, respectively. Unfortunately, the IFLS data have no information regarding whether a household has ever received CCT transfers. Thus, only a variable denoting whether a household received UCT transfers is included.

Equation (1) assumes that the impact of the crisis is the same at every period in a young child's life. To account for the possibility that some periods in early childhood are particularly sensitive for children's cognitive development, a more flexible specification is also used:

$$\begin{aligned} Y_{imta} = \beta_0 + \beta_1 L_t^{prenatal} + \beta_2 L_t^{0to11} + \beta_3 L_t^{12to23} + \beta_4 L_t^{24to35} + \beta_5 L_t^{above35} \\ + \alpha_0 t + \alpha_1 t^2 + \sum_{p=1}^{21} \alpha_p t * prov_p + \delta X_{imta} + \theta_m + \eta_a + \epsilon_{imta} \end{aligned} \tag{3.2}$$

where $L_t^{prenatal}$ is the length of time (in months) a child is exposed to the crisis while in utero; L_t^{0to11} length of time that a child is exposed to the crisis between ages of 0 to 11 months; L_t^{12to23} is the length of time that a child is exposed to the crisis between the ages of 12 to 23 months; L_t^{12to23} is the length of time that a child is exposed to the crisis between the ages of 24 to 35 months; and lastly $L_t^{above35}$ is length of time that a child is exposed to the crisis when 24-months of age and above.

Table 3.4 provides the summary statistics of variables that are used in the estimations. To provide a general picture of the data structure, the table is presented with three columns. The first column show the total number of children ages 7 to 14 years from both IFLS rounds (2007 and 2014). From more than 14,000 children, around 5,000 of them have no siblings in the IFLS 2014 round and around 9,000 children have siblings between 7 to 14 years of age in that round. Focusing on children in column (3), of Table 3.4, in general, exposure to the crisis is around 9 months. However, conditional on being exposed to the crisis, the exposure length is around 23 months. More than 50 percent of the children are male, and most children have their father living in the household (more than 90 percent). Around 95 percent of the mothers are married. The average age of a mother when a child is born is around 27 years. Slightly more than 40 percent of the sample are from farming households, and slightly more than one fourth of the sample received UCT transfers. Most of children also live in urban areas. Note that the test score variables are standardized using the mean and standard deviation of the 2014 children's test scores.

3.5 Results

This section is divided into two parts. The first part presents the main estimates of the impact of the length of exposure to the crisis on child cognitive skills. The second part presents the robustness checks to assess the credibility of the results.

3.5.1 Main Estimation Results

Tables 3.5 and 3.6 provide the estimation results for the specification in equation (1). The results in Table 3.5 show small but often statistically significant negative impacts of exposure to the crisis length on total scores and math scores. An increase in exposure to the crisis by one month reduces the standardized total test scores by 0.010 standard deviation (at the 5 percent level) and reduces math scores by 0.015 standard deviation (at the 1 percent level). Thus, for a child exposed to the whole crisis (about 38 months), he or she would have a lower test score of about 0.38 standard deviation for total test scores and 0.57 standard deviation for math scores, which are quite large effects. The estimated impacts on cognitive scores is somewhat smaller (0.006 standard deviation) and not statistically significant.

The results differ for the urban and rural populations, as shown in Table 3.6. The impacts are larger when the sample is limited to urban population; an additional one-month of exposure to the crisis reduces total scores by 0.015 standard deviation at the 5 percent statistical level and reduces math scores by 0.018 standard deviation at the 1 percent statistical level. Again, these negative effects in urban areas imply quite large effects for 38 months exposure to the crisis, 0.57 standard deviation for total scores and 0.684 for cognitive scores. As in Table 3.5, the estimated impacts is on cognitive scores is smaller (0.010 standard deviation), although it is marginally significant (at the 10 percent level) in the estimation using only urban population. These generally negative effects are completely absent in rural areas; none of the estimates using rural sample is statistically significant.

If the length of exposure variable is limited to exposure to the crisis after birth, the results change. These results are presented in Tables 3.19 and 3.20. Comparing Tables 3.5 and 3.19, the estimated impact of exposure to the crisis variable in Table 3.19 is no longer statistically significant for any of the estimations. Similarly, when the sample is disaggregated into urban and rural areas in Table 3.20, there are no longer statistically significant impacts for urban areas. This suggests that the negative impacts of the crisis may be most severe for the children who were exposed to the crisis while they were still in utero.

To examine the validity of this conjecture, Tables 3.7 and 3.8 provide the results of the estimations using a more flexible specification that allows for differential impacts of exposure to the crisis for different ages. The results clearly support this conjecture. Table 3.7 shows that longer exposure to the crisis in utero significantly reduces children's cognitive skills. The negative impact of 0.047 standard deviation per month (for total scores) implies that exposure to the crisis for all 9 months of gestation reduces a child's cognitive skills by 0.42 standard deviation, which is a very large effect. Note also that, in contrast to Table 3.5, the estimates of the impact of crisis exposure variable on cognitive scores is now statistically significant at 5 percent level. In particular, an increase of exposure to the crisis in utero by one month reduces the standardized cognitive score by 0.033 standard deviation, which is also a very large effect. Turning to post-natal time period, for all three test score variables, the estimated impacts are smaller in size and statistically insignificant. Overall, the crisis appears to have no impacts on the children who experienced it after they were born.

Table 3.8 repeats the analysis Table 3.5, but does so separately for rural and urban areas. The results show that virtually all of the burden of the negative impacts of the crisis were borne by children living in urban areas. An increase of crisis exposure by one month while in utero reduces total scores, basic cognitive scores and math scores by 0.061, 0.032 and 0.093 standard deviations, respectively. These estimated impacts imply that exposure for all nine months of gestation reduce urban children's test scores later in life by 0.55 to 0.84 standard deviations of the distribution of test scores, which is a huge effect. Two of these estimates are statistically significant at the 1 percent level (total score and math score), while estimate on cognitive score is statistically significant at the 5 percent level. Although some post natal period show some statistical significant impacts, they are marginal at best at only the 10 percent level.

Turning to rural children, none of the point estimates are statistically significant. One interpretation of this result is that rural farming households may be able to insulate themselves from the impacts of rising food prices during the crisis because they produce many or most of their basic food goods.

Among the control variables, boys appear to perform worse in math questions in all estimations. Children from wealthier households, as measured by the asset index variable, also have higher test scores. Surprisingly, the children in households in rural areas who received UCT transfers have much lower test scores. One possible reason for this is a reverse causality between test scores and UCT transfers receipt; i.e. households who have children with lower performance are more likely to receive UCT transfers. Overall, the main results appear to indicate that exposure to crisis may have negative impacts on test scores depending on the length of exposure to the crisis while the child is in utero. The negative impacts are found only in urban areas, which suggest that rural household were able to insulate their children from the worst impacts of the crisis.

3.5.2 Robustness Check

The robustness check, to assess the validity of main estimation results, are conducted as the following. The first robustness check will re-estimate equation (1) and (2) using different cluster, 1997 village level clusters. This check is conducted to examine whether the results are robust to the usage of different clusters. The second check is conducted by limiting the sample to children age 0-3 years old in 1997 (the beginning of crisis year). This is because the sample that uses only youngest impacted children may behave differently to the one that includes the full sample. Thus, the children to be considered for the sample has age range between 7 to 13 years old instead of 7 to 14 years old in 2007. Around 12 percent of the sample is lost when the sample is limited to only children between 7 to 13 years old in 2007. Lastly, because the negative impacts of the crisis is only robust for urban areas, the last robustness check is conducted by estimating the same specification using only rural sample but disaggregated by farming and non-farming households. This is to examine whether the lack of negative impact in rural areas is due to access to farming land.

The results for the estimation using village level cluster are given in Tables 3.9, 3.10 ,3.11 and 3.12. Compared to the main estimations results (Tables 3.5 to 3.8), the estimates using village level cluster appear to have less power in terms of statistical significance level. For example, the estimates of length of crisis exposure on math score is statistically significant at the 1 percent level in Table 3.5. However, the same coefficient is statistically significant at only the 5 percent level in Table 3.9. When estimations are conducted only on rural households sample, length of crisis exposure has marginal or statistically insignificant impact on total score and cognitive score. These differences also hold for children in urban households when the estimations include a more flexible form of length of exposure to the crisis.

Tables 3.13, 3.14 ,3.15 and 3.16 present the estimated impacts of the crisis on children age 7 to 13 years old in 2007 and 2014. Table 3.13 shows that, unlike the results in Table 3.5, the crisis exposure coefficients are only marginally significant at the 10 percent level for the estimates on total score and basic cognitive score. Furthermore, the estimated impact on math score is no longer significant for urban population, although the estimated impact on total score and basic cognitive score is still statistically significant at the 5 percent level. The estimated impact of in-utero crisis exposure is still highly significant at the 1 percent level in all estimations. This further support the main estimation results showing the importance of in-utero development for children later in life.

Lastly, Tables 3.17, 3.18 present estimation results using only children in rural household sample disaggregated by farming and non-farming households. Table 3.17 shows identical results to the main estimation results using only the sample of children in rural areas. There is no statistically significant negative impact of the crisis to the children in either farming or non-farming households. Table 3.18, however, shows some negative impacts of the crisis on non-farming households. Specifically, an additional one-month of exposure to the crisis while in utero reduces total scores for children in rural non-farming households by

0.073 standard deviation. This impact is, again, very huge for children who were exposed to the crisis for their full gestation period. The result suggests that access to farming land may be important for households in rural areas to avoid the negative impacts of the crisis on child health.

3.6 Conclusion

This study attempts to estimate the causal impacts of the 1997 Asian Financial crisis on Indonesian children's cognitive skills. In order to identify the estimates, the study exploits the longitudinal nature of the Indonesian Family Life Survey (IFLS) data, by using sample children from the 2007 and 2014 IFLS. The estimates are identified by comparing cognitive skill differences between siblings in the same households with cognitive skill differences of siblings in different households that have the same sibling age gap.

The main variable of interest is the length of exposure to the crisis (in months) that a child experienced. To account for the possibility of sensitive periods in early child development, flexible specifications that differentiate between different phases of early childhood development were also estimated. The crisis period is determined by referring to the GDP data and to the literature focusing on Indonesia's financial crisis. As such, the crisis period is defined to be between August 1997 to December 1999. Thus, children born in December 1999 would have been exposed to the crisis by around one month after birth. To account for the deleterious impacts of the crisis to fetal development, the length of exposure to the crisis variable includes months exposed to the crisis while in utero. Thus a child born in December 1999 and was born after 9 months of pregnancy is classified as being exposed to the crisis by around 10 months (1 month after birth and 9 months in utero).

The results show that the negative impacts of the crisis mostly are felt by children in urban areas. In rural areas, possibly due to the abilities of parents to shield their children from the most negative impacts of the crisis by self producing basic needs, the impacts of the crisis on rural children is generally not significant. This ability to insulate the children from the crisis appears to apply mostly to farming households in rural areas as the results show some negative impacts of the crisis on non-farming households in rural areas. If we differentiate between the stages of early childhood development, the impacts of the crisis appear to be most detrimental when the children are exposed to the crisis in utero. This finding seems to be consistent with the findings by Glewwe and King (2001) on children in the Phillipines. In contrast, although Hidrobo (2014) finds negative impacts of crisis exposure in utero for cognitive skills of children in Ecuador, she also finds that length of exposure to the crisis between ages 0 to 11 months and between ages 12 to 23 months have also negative impacts on child cognitive scores.

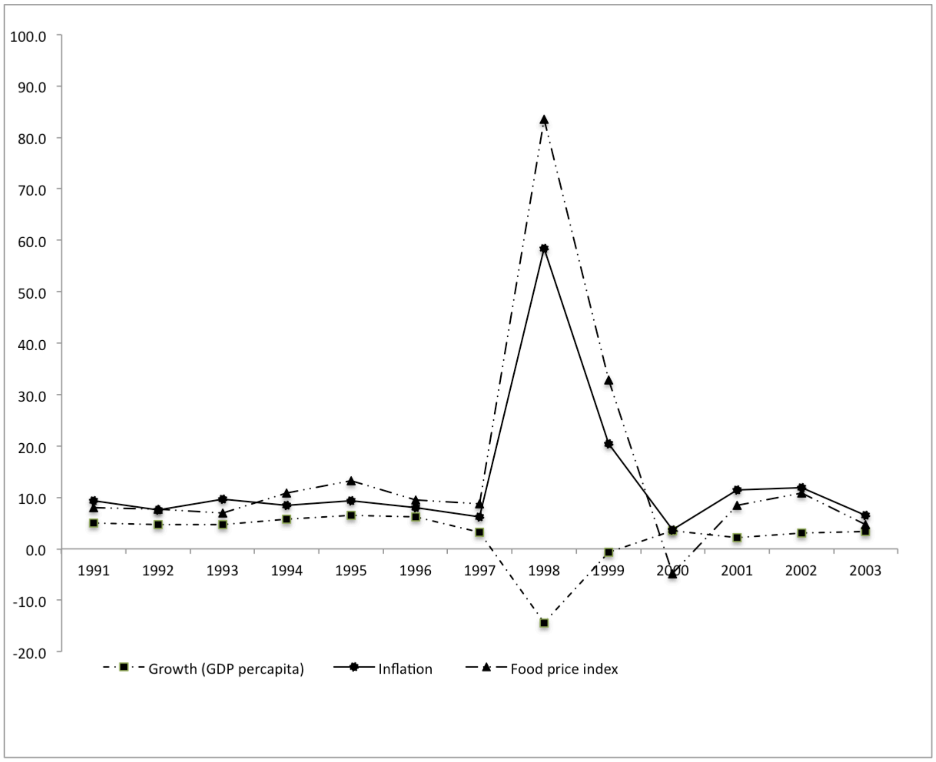
Several policy implications can be drawn from the estimation results. First, because the impact of the crisis is most severe when children are exposed to it while in utero, in time of economic shocks social safety nets focusing on pregnant women may be important to reduce the impact of crisis on children's cognitive skills. Second, the negative impacts of the crisis on rural non-farming households suggest that the negative impacts of the crisis may be distributed mostly through reduction in quality and quantity of nutrition. Thus, policies that protect nutritional status of pregnant women and their children are important. Lastly, the impacts of macroeconomic shocks appear to mostly affect children in urban areas.

This implies that during crisis, some policies targeted specifically for children in the urban areas might be needed.

In conclusion, the results provide evidence that the impacts of the crisis on children were negative for children in urban or non-farming rural households. Nevertheless, the interpretation of the results need to account for the possibility that the underlying assumptions for the identification may be violated which may cause some bias in the estimates.

Tables and Figures

Figure 3.1: *Indonesian GDP percapita growth, inflation and food price index (annual %)*



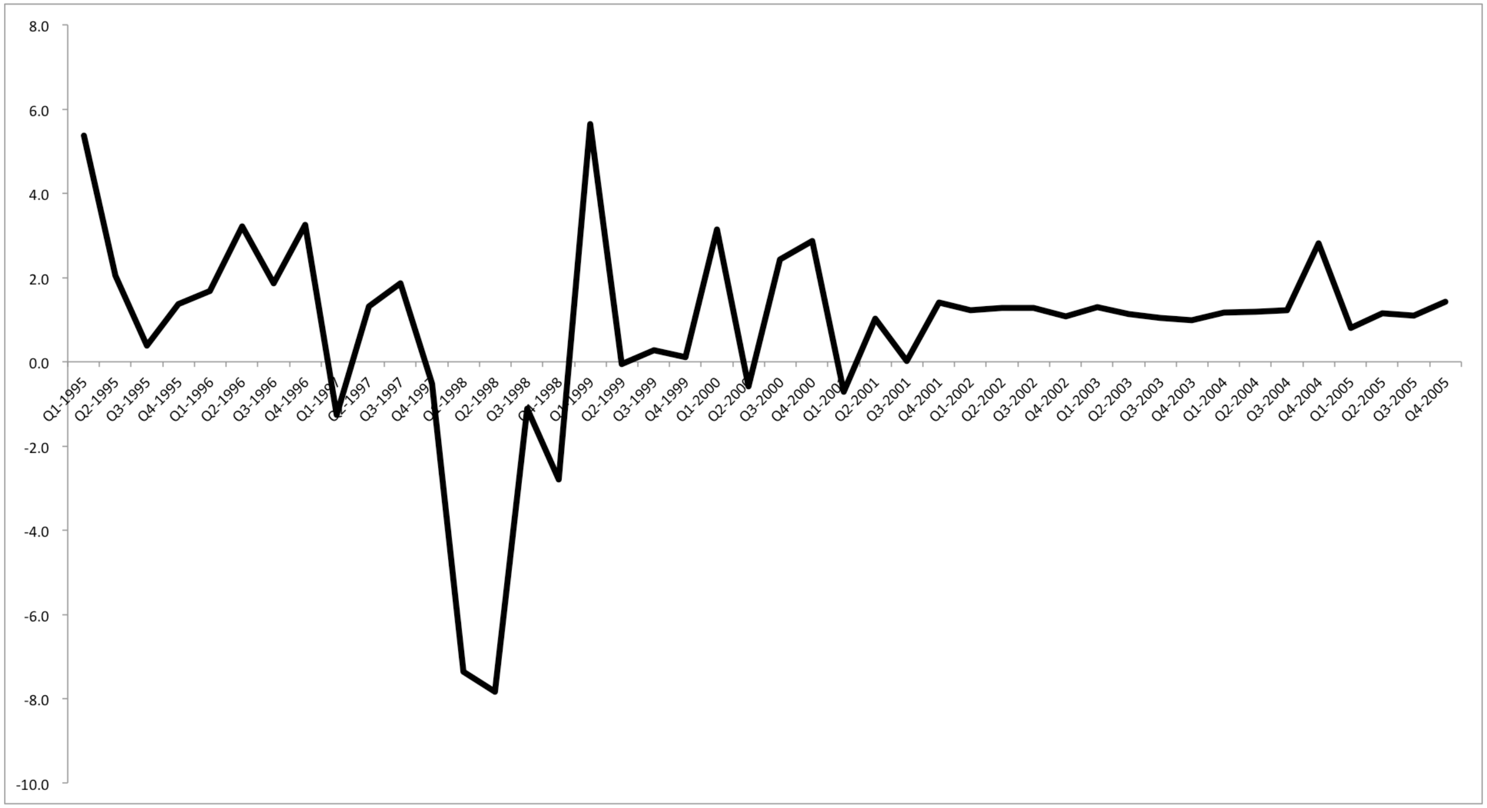
Source: World Development Indicators

Table 3.1: *Social Protection Program during Economic Crisis in Indonesia*

Program	Description of benefits	Fiscal Year 98/99 Budget (billion IDR)	Coverage
OPK (subsidized rice)	Sales of subsidized rice to targeted households	5,450	12.8 million poor households
Padat karya programs (employment creation)	A loose, uncoordinated collection of several *labor-intensive* programs in a variety of government departments	2,066	12.7 million man-days
SBG (scholarships & block grants to schools)	Providing scholarships directly to elementary, lower secondary, and upper secondary students and block grants to selected schools	1,138	6% of primary, 17% of lower secondary, 10% of upper secondary school students, 60% of schools
SSN-BK (health cards)	Providing subsidies for medical services, operational support for health centers, medicine and imported medical equipment, family planning services, supplemental food, midwife services	1,043	7.4 million poor households
PDM-DKE (community empowerment)	Block grants for villages for public works or revolving funds for credit	1,701	Almost all villages in the country

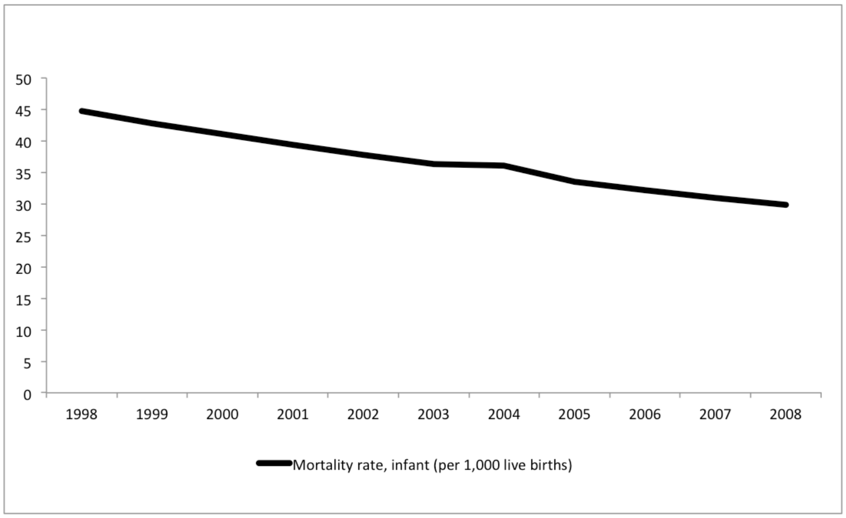
Source: Samuel and Bazzi (2011)

Figure 3.2: *Real GDP Growth (quarterly %)*



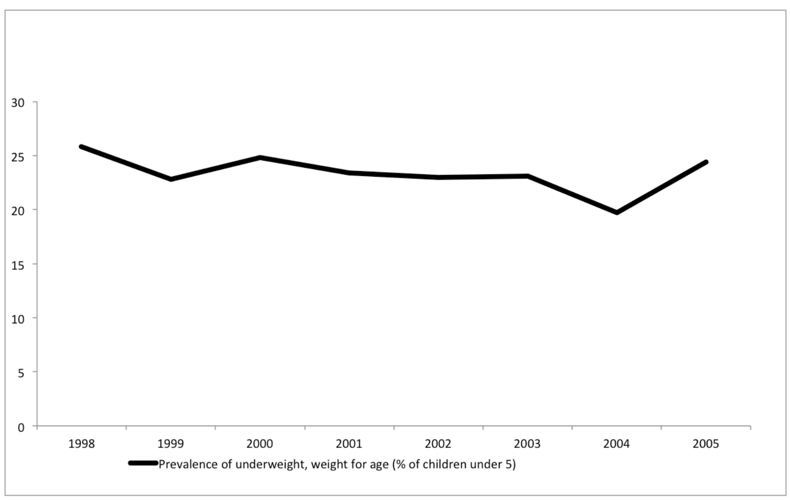
Source: World Development Indicators

Figure 3.3: *Infant Mortality Rate (per 1,000 live births)*



Source: World Development Indicators

Figure 3.4: *Prevalence of underweight, weight for age (% of children under 5)*



Source: World Development Indicators

Table 3.2: *Birth Month and Months of Crisis Exposure*

Month of birth	Months in utero	Birth-month (labeled)	Months of crisis exposure
July 2008	7 months	187	0
June 2008	9 months	186	0
January 2007	9 months	169	0
August 2000	*8 months*	92	*0*
August 2000	*9 months*	92	*1*
December 1999	9 months	84	10
September 1998	*7 months*	*66*	*23*
September 1998	*9 months*	*66*	*25*
August 1997	9 months	70	29
December 1996	9 months	67	29
May 1994	9 months	17	29
January 1993	9 months	1	29

Table 3.3: *Identification of the Estimates*

Identification: $Y_{imta} = \beta_1 L_t + \alpha_0 t + \sum_{p=1}^{21} \alpha_p t * prov_p + \theta_m + \eta_a$

HH	Child	Survey month	Birth month	Age in months	Months of crisis exposure	θ_m	η_a	$\beta_1 L_t$	$\alpha_0 t+$ $\sum_{p=1}^{21} \alpha_p t$ $*prov_p$	$Y_{1mta} - Y_{2mta}$	Diff-in-diff
1	1	Jan 2007	115 (Jan 1999)	97	12	θ_1	η_{97}	$\beta_1 L_t$	$\alpha_0 115$		$= \beta_1 L_t$
1	2	Jan 2007	91 (Jan 2001)	73	0	θ_1	η_{73}	0	$\alpha_0 91$	$= \eta_{97} - \eta_{73} +$ $\alpha_0(115 - 91) + \beta_1 L_t$	
2	1	Jan 2014	31 (Jan 2006)	97	0	θ_2	η_{97}	0	$\alpha_0 31$		
2	2	Jan 2014	7 (Jan 2008)	73	0	θ_2	η_{73}	0	$\alpha_0 7$	$= \eta_{97} - \eta_{73} + \alpha_0(31 - 7)$	
3	1	Jan 2007	115 (Jan 1999)	97	12	θ_3	η_{97}	$\beta_1 L_t$	$\alpha_0 115$		$= \beta_1 L_t$
3	2	Jan 2014	31 (Jan 2006)	97	0	θ_3	η_{97}	0	$\alpha_0 31$	$= \alpha_0(115 - 31) + \beta_1 L_t$	
4	1	Jan 2007	91 (Jan 2001)	73	0	θ_4	η_{73}	0	$\alpha_0 91$		
4	2	Jan 2014	7 (Jan 2008)	73	0	θ_4	η_{73}	0	$\alpha_0 7$	$\alpha_0(91 - 7)$	

Table 3.4: *Summary Statistics*

	All children			Children with no siblings			Children with siblings			P value of diff: (2) and (3)	
	Mean	Std.Dev	Obs	Mean	Std.Dev	Obs	Mean	Std. Dev	Obs	Mean	Std. Err
		(1)			(2)			(3)			
Total score (standardized)	0.145	0.93	14555	0.134	0.95	5262	0.151	0.92	9293	0.015	0.48
Basic cognitive score (standardized)	0.149	0.93	14555	0.139	0.95	5262	0.154	0.92	9293	0.013	0.48
Math score (standardized)	0.602	0.86	14555	0.593	0.88	5262	0.607	0.85	9293	0.012	0.47
Length of exposure to crisis (months)	8.773	12.6	14830	8.978	12.83	5339	8.658	12.47	9491	-0.324	0.00
Birth month	97.671	49.41	14799	103.597	53.76	5325	94.341	46.46	9474	-9.257	0.31
Male (=1)	0.516	0.50	14835	0.51	0.50	5341	0.519	0.50	9494	0.009	0.00
Father live in household (=1)	0.885	0.32	12584	0.851	0.36	4048	0.901	0.30	8536	0.050	0.00
Mother's age	37.128	6.56	13795	36.212	7.39	4634	37.592	6.04	9161	1.374	0.00
Mother is married (=1)	0.939	0.24	13665	0.917	0.28	4566	0.949	0.22	9099	0.033	0.00
Mother's age on birth of child i	26.818	6.15	13795	26.087	6.68	4634	27.187	5.84	9161	1.093	0.00
Farming households (=1)	0.416	0.49	14719	0.411	0.49	5286	0.419	0.49	9433	0.008	0.35
Asset Index	0.234	1.54	14705	0.252	1.54	5281	0.224	1.54	9424	-0.027	0.41
UCT Household	0.245	0.43	14690	0.212	0.41	5274	0.264	0.44	9416	0.053	0.00
Urban	0.551	0.50	14301	0.552	0.50	4978	0.550	0.50	9323	-0.002	0.80

Column (1): all children of 7 to 14 of ages in 2007 and 2014, Column (2): children who have no siblings age 7 to 14 years old in the 2014 data, and column (3): children who have siblings age 7 to 14 years old in the 2014.

Standard errors for the P-value of differences are clustered at birth month cohorts.

Table 3.5: *Fixed Effect Estimation of Crisis Exposures on Test Scores*

	Total score	Basic cognitive score	Math score
Months exposed to crisis (including while in utero)	-0.010**	-0.006	-0.015***
	(0.004)	(0.004)	(0.004)
Birth month	-0.016	-0.004	-0.034***
	(0.011)	(0.009)	(0.012)
Birth month sq	0.000	-0.000	0.000**
	(0.000)	(0.000)	(0.000)
Male	-0.041	0.028	-0.164***
	(0.036)	(0.035)	(0.041)
Father lived in household	-0.255*	-0.238	-0.180
	(0.144)	(0.152)	(0.139)
Mother's age	0.032	0.056	-0.029
	(0.101)	(0.107)	(0.083)
Mother is married	0.132	0.009	0.325
	(0.231)	(0.239)	(0.279)
Mother's age on birth of child i	-0.112	-0.129	-0.032
	(0.104)	(0.110)	(0.088)
UCT household	-0.284***	-0.263***	-0.206**
	(0.087)	(0.092)	(0.080)
Farming household	-0.028	0.052	-0.180*
	(0.093)	(0.088)	(0.099)
Asset index	0.192***	0.197***	0.102***
	(0.031)	(0.033)	(0.029)
Urban	0.023	-0.003	0.066
	(0.122)	(0.121)	(0.145)
Observations	11781	11781	11781
Adjusted R^2	0.191	0.154	0.137

Standard errors, clustered at birth month cohorts, in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

All test scores are standardized using variable means and standard deviation

Table 3.6: *Fixed Effect Estimation of Crisis Exposures on Test Scores (Urban/Rural)*

	Urban			Rural		
	Total score	Basic cognitive score	Math score	Total score	Basic cognitive score	Math score
Months exposed to crisis	-0.015**	-0.010*	-0.018***	-0.003	0.000	-0.007
(including while in utero)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)
Birth month	-0.038***	-0.027**	-0.045***	0.018	0.027**	-0.009
	(0.011)	(0.011)	(0.013)	(0.014)	(0.014)	(0.014)
Birth month sq	0.000	-0.000	0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	-0.061	0.010	-0.178***	-0.023	0.049	-0.159***
	(0.049)	(0.049)	(0.055)	(0.052)	(0.053)	(0.058)
Father lived in household	-0.086	-0.010	-0.203	-0.453**	-0.516***	-0.134
	(0.209)	(0.220)	(0.196)	(0.191)	(0.197)	(0.176)
Mother's age	0.112	0.195	-0.105	0.019	0.015	0.019
	(0.172)	(0.199)	(0.143)	(0.121)	(0.123)	(0.101)
Mother is married	0.058	-0.220	0.597*	0.094	0.164	-0.087
	(0.306)	(0.323)	(0.329)	(0.281)	(0.272)	(0.418)
Mother's age on birth of child i	-0.119	-0.181	0.058	-0.154	-0.154	-0.087
	(0.178)	(0.211)	(0.142)	(0.122)	(0.122)	(0.110)
UCT household	-0.147	-0.137	-0.105	-0.391***	-0.365***	-0.279**
	(0.116)	(0.134)	(0.109)	(0.121)	(0.122)	(0.115)
Farming household	-0.044	0.035	-0.185	0.031	0.104	-0.129
	(0.155)	(0.152)	(0.145)	(0.121)	(0.127)	(0.121)
Asset index	0.227***	0.247***	0.089**	0.145***	0.136**	0.100**
	(0.039)	(0.041)	(0.039)	(0.048)	(0.053)	(0.041)
Observations	6593	6593	6593	5188	5188	5188
Adjusted R^2	0.211	0.165	0.167	0.201	0.174	0.126

Standard errors, clustered at birth month cohorts, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

All test scores are standardized using variable means and standard deviation

Table 3.7: *Fixed Effect Estimation of Crisis Exposures by Ages on Test Scores*

	Total score	Basic cognitive score	Math score
Months exposed to crisis while in utero	-0.047***	-0.033**	-0.055***
	(0.014)	(0.014)	(0.014)
Months exposed to crisis between 0-11 months of age	0.010	0.002	0.023
	(0.015)	(0.015)	(0.014)
Months exposed to crisis between 12-23 months of age	-0.028	-0.022	-0.027
	(0.018)	(0.018)	(0.019)
Months exposed to crisis between 24-35 months of age	-0.011	-0.012	-0.005
	(0.014)	(0.014)	(0.014)
Months exposed to crisis above 35 months of age	-0.018	-0.022	-0.001
	(0.023)	(0.022)	(0.024)
Birth month	-0.015	-0.010	-0.018
	(0.017)	(0.016)	(0.019)
Birth month sq	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)
Male	-0.040	0.029	-0.163***
	(0.036)	(0.036)	(0.041)
Father lived in household	-0.255*	-0.240	-0.178
	(0.145)	(0.152)	(0.140)
Mother's age	0.027	0.053	-0.037
	(0.103)	(0.108)	(0.084)
Mother is married	0.125	0.004	0.318
	(0.232)	(0.239)	(0.279)
Mother's age on birth of child i	-0.107	-0.126	-0.023
	(0.106)	(0.111)	(0.090)
UCT household	-0.290***	-0.267***	-0.212***
	(0.087)	(0.092)	(0.079)
Farming household	-0.027	0.053	-0.178*
	(0.092)	(0.088)	(0.099)
Asset index	0.193***	0.197***	0.102***
	(0.031)	(0.033)	(0.029)
Urban	0.033	0.005	0.076
	(0.121)	(0.121)	(0.144)
Observations	11781	11781	11781
Adjusted R^2	0.192	0.154	0.139

Standard errors, clustered at birth month cohorts, in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

All test scores are standardized using variable means and standard deviation

Table 3.8: *Fixed Effect Estimation of Crisis Exposures by Ages on Test Scores (Urban/Rural)*

	Urban			Rural		
	Total score	Basic cognitive score	Math score	Total score	Basic cognitive score	Math score
Months exposed to crisis while in utero	-0.061***	-0.032*	-0.093***	-0.029	-0.033	-0.007
	(0.018)	(0.018)	(0.017)	(0.022)	(0.021)	(0.023)
Months exposed to crisis between 0-11 months of age	-0.007	-0.021	0.022	0.039	0.036	0.030
	(0.020)	(0.021)	(0.019)	(0.024)	(0.024)	(0.023)
Months exposed to crisis between 12-23 months of age	-0.040*	-0.033	-0.037*	-0.009	0.001	-0.025
	(0.023)	(0.025)	(0.021)	(0.030)	(0.028)	(0.033)
Months exposed to crisis between 24-35 months of age	-0.025	-0.025	-0.015	0.016	0.016	0.009
	(0.019)	(0.020)	(0.018)	(0.023)	(0.023)	(0.020)
Months exposed to crisis above 35 months of age	-0.047*	-0.050	-0.022	0.030	0.030	0.016
	(0.028)	(0.031)	(0.027)	(0.038)	(0.035)	(0.040)
Birth month	-0.043**	-0.039**	-0.032	0.015	0.025	-0.012
	(0.018)	(0.019)	(0.020)	(0.029)	(0.032)	(0.026)
Birth month sq	0.000	0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	-0.058	0.013	-0.177***	-0.021	0.052	-0.159***
	(0.049)	(0.049)	(0.055)	(0.053)	(0.053)	(0.058)
Father lived in household	-0.083	-0.015	-0.187	-0.462**	-0.525***	-0.138
	(0.210)	(0.220)	(0.199)	(0.194)	(0.200)	(0.179)
Mother's age	0.102	0.192	-0.124	0.011	0.005	0.018
	(0.176)	(0.201)	(0.148)	(0.124)	(0.126)	(0.103)
Mother is married	0.047	-0.225	0.578*	0.099	0.165	-0.078
	(0.307)	(0.324)	(0.332)	(0.284)	(0.273)	(0.422)
Mother's age on birth of child i	-0.109	-0.179	0.079	-0.147	-0.146	-0.086
	(0.182)	(0.214)	(0.147)	(0.125)	(0.124)	(0.112)
UCT household	-0.148	-0.138	-0.107	-0.400***	-0.374***	-0.283**
	(0.116)	(0.134)	(0.109)	(0.122)	(0.123)	(0.115)
Farming household	-0.034	0.041	-0.172	0.029	0.103	-0.131
	(0.156)	(0.153)	(0.145)	(0.122)	(0.128)	(0.121)
Asset index	0.228***	0.247***	0.091**	0.142***	0.134**	0.097**
	(0.039)	(0.041)	(0.039)	(0.048)	(0.053)	(0.041)
Observations	4505	4505	4505	3569	3569	3569
Adjusted R^2	0.205	0.157	0.162	0.192	0.164	0.116

Standard errors, clustered at birth month cohorts, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
All test scores are standardized using variable means and standard deviation

Table 3.9: *Fixed Effect Estimation of Crisis Exposures on Test Scores*

	Total score	Basic cognitive score	Math score
Months exposed to crisis (including while in utero)	-0.008	-0.005	-0.012**
	(0.005)	(0.006)	(0.005)
Birth month	-0.021**	-0.010	-0.036**
	(0.009)	(0.007)	(0.015)
Birth month sq	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)
Male	-0.074	-0.002	-0.189***
	(0.047)	(0.049)	(0.051)
Father lived in household	-0.220	-0.255	-0.054
	(0.205)	(0.219)	(0.183)
Mother's age	0.074	0.074	0.044
	(0.101)	(0.104)	(0.085)
Mother is married	0.117	0.031	0.241
	(0.304)	(0.313)	(0.278)
Mother's age on birth of child i	-0.153	-0.153	-0.088
	(0.100)	(0.105)	(0.090)
UCT household	-0.269***	-0.251**	-0.192*
	(0.101)	(0.104)	(0.112)
Farming household	-0.015	0.068	-0.177
	(0.118)	(0.111)	(0.129)
Asset index	0.191***	0.186***	0.120***
	(0.039)	(0.039)	(0.040)
Urban	0.063	0.029	0.105
	(0.191)	(0.207)	(0.155)
Observations	10486	10486	10486
Adjusted R^2	0.189	0.155	0.133

Standard errors, clustered at village level in 2007, in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

All test scores are standardized using variable means and standard deviation

Table 3.10: *Fixed Effect Estimation of Crisis Exposures on Test Scores (Urban/Rural)*

	Urban			Rural		
	Total score	Basic cognitive score	Math score	Total score	Basic cognitive score	Math score
Months exposed to crisis	-0.015*	-0.012	-0.015**	0.002	0.004	-0.003
(including while in utero)	(0.008)	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)
Birth month	-0.037***	-0.028**	-0.039***	-0.009	-0.001	-0.020
	(0.012)	(0.012)	(0.014)	(0.019)	(0.018)	(0.018)
Birth month sq	0.000	-0.000	0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	-0.093	-0.021	-0.199***	-0.051	0.027	-0.187**
	(0.067)	(0.067)	(0.068)	(0.071)	(0.074)	(0.077)
Father lived in household	-0.179	-0.142	-0.178	-0.251	-0.372	0.100
	(0.327)	(0.350)	(0.261)	(0.254)	(0.268)	(0.240)
Mother's age	0.114	0.144	0.003	0.067	0.048	0.078
	(0.198)	(0.229)	(0.129)	(0.115)	(0.117)	(0.099)
Mother is married	0.233	-0.076	0.759**	-0.215	-0.046	-0.466
	(0.451)	(0.481)	(0.346)	(0.377)	(0.383)	(0.411)
Mother's age on birth of child i	-0.124	-0.134	-0.051	-0.206*	-0.206*	-0.119
	(0.202)	(0.240)	(0.136)	(0.120)	(0.118)	(0.112)
UCT household	-0.115	-0.097	-0.101	-0.413***	-0.405***	-0.253*
	(0.142)	(0.154)	(0.144)	(0.128)	(0.133)	(0.144)
Farming household	0.001	0.097	-0.192	-0.001	0.060	-0.123
	(0.156)	(0.154)	(0.160)	(0.165)	(0.158)	(0.187)
Asset index	0.219***	0.231***	0.101*	0.153***	0.135**	0.124**
	(0.052)	(0.053)	(0.055)	(0.052)	(0.052)	(0.062)
Observations	5776	5776	5776	4710	4710	4710
Adjusted R^2	0.211	0.166	0.165	0.196	0.172	0.121

Standard errors, clustered at village level in 2007, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
All test scores are standardized using variable means and standard deviation

Table 3.11: *Fixed Effect Estimation of Crisis Exposures by Ages on Test Scores*

	Total score	Basic cognitive score	Math score
Months exposed to crisis while in utero	-0.033*	-0.019	-0.048**
	(0.018)	(0.018)	(0.020)
Months exposed to crisis between 0-11 months of age	0.010	-0.000	0.026
	(0.019)	(0.019)	(0.021)
Months exposed to crisis between 12-23 months of age	-0.015	-0.008	-0.023
	(0.026)	(0.027)	(0.025)
Months exposed to crisis between 24-35 months of age	-0.000	-0.003	0.005
	(0.016)	(0.017)	(0.017)
Months exposed to crisis above 35 months of age	0.000	-0.004	0.009
	(0.029)	(0.030)	(0.030)
Birth month	-0.012	-0.007	-0.017
	(0.020)	(0.020)	(0.023)
Birth month sq	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Male	-0.072	-0.001	-0.187***
	(0.047)	(0.049)	(0.051)
Father lived in household	-0.221	-0.257	-0.054
	(0.206)	(0.219)	(0.185)
Mother's age	0.070	0.072	0.038
	(0.102)	(0.105)	(0.086)
Mother is married	0.114	0.029	0.237
	(0.304)	(0.313)	(0.278)
Mother's age on birth of child i	-0.149	-0.151	-0.081
	(0.101)	(0.105)	(0.091)
UCT household	-0.272***	-0.252**	-0.197*
	(0.102)	(0.104)	(0.111)
Farming household	-0.013	0.070	-0.175
	(0.118)	(0.112)	(0.129)
Asset index	0.191***	0.186***	0.121***
	(0.039)	(0.039)	(0.040)
Urban	0.069	0.032	0.114
	(0.190)	(0.208)	(0.154)
Observations	10486	10486	10486
Adjusted R^2	0.189	0.154	0.134

Standard errors, clustered at village level in 2007, in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

All test scores are standardized using variable means and standard deviation

Table 3.12: *Fixed Effect Estimation of Crisis Exposures by Ages on Test Scores (Urban/Rural)*

	Urban			Rural		
	Total score	Basic cognitive score	Math score	Total score	Basic cognitive score	Math score
Months exposed to crisis while in utero	-0.059**	-0.030	-0.091***	-0.009	-0.015	0.005
	(0.025)	(0.024)	(0.026)	(0.027)	(0.027)	(0.030)
Months exposed to crisis between 0-11 months of age	-0.010	-0.025	0.024	0.039	0.032	0.036
	(0.024)	(0.026)	(0.026)	(0.030)	(0.031)	(0.031)
Months exposed to crisis between 12-23 months of age	-0.036	-0.032	-0.028	0.006	0.022	-0.029
	(0.033)	(0.034)	(0.035)	(0.041)	(0.040)	(0.041)
Months exposed to crisis between 24-35 months of age	-0.013	-0.018	0.003	0.020	0.020	0.012
	(0.022)	(0.025)	(0.023)	(0.027)	(0.028)	(0.027)
Months exposed to crisis above 35 months of age	-0.036	-0.044	-0.004	0.043	0.048	0.014
	(0.037)	(0.040)	(0.040)	(0.048)	(0.049)	(0.051)
Birth month	-0.039	-0.041	-0.019	0.015	0.025	-0.012
	(0.025)	(0.027)	(0.028)	(0.036)	(0.037)	(0.032)
Birth month sq	0.000	0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	-0.086	-0.016	-0.192***	-0.048	0.031	-0.188**
	(0.066)	(0.068)	(0.068)	(0.072)	(0.074)	(0.078)
Father lived in household	-0.178	-0.147	-0.165	-0.253	-0.377	0.106
	(0.326)	(0.349)	(0.262)	(0.255)	(0.268)	(0.243)
Mother's age	0.110	0.144	-0.007	0.062	0.040	0.081
	(0.201)	(0.230)	(0.133)	(0.117)	(0.120)	(0.100)
Mother is married	0.220	-0.082	0.738**	-0.210	-0.041	-0.464
	(0.451)	(0.481)	(0.349)	(0.378)	(0.384)	(0.411)
Mother's age on birth of child i	-0.119	-0.134	-0.038	-0.202*	-0.199*	-0.122
	(0.205)	(0.240)	(0.139)	(0.121)	(0.118)	(0.112)
UCT household	-0.113	-0.096	-0.100	-0.417***	-0.410***	-0.256*
	(0.142)	(0.154)	(0.144)	(0.128)	(0.134)	(0.143)
Farming household	0.014	0.104	-0.173	-0.005	0.057	-0.128
	(0.158)	(0.155)	(0.160)	(0.165)	(0.158)	(0.186)
Asset index	0.219***	0.231***	0.103*	0.150***	0.134**	0.120*
	(0.052)	(0.053)	(0.054)	(0.051)	(0.052)	(0.062)
Observations	5776	5776	5776	4710	4710	4710
Adjusted R^2	0.212	0.166	0.170	0.196	0.172	0.122

Standard errors, clustered at village level in 2007, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
All test scores are standardized using variable means and standard deviation

Table 3.13: *Fixed Effect Estimation of Crisis Exposures on Test Scores (Children 7-13 years old in 2007 and 2014)*

	Total score	Basic cognitive score	Math score
Months exposed to crisis (including while in utero)	-0.009*	-0.006	-0.009*
	(0.005)	(0.005)	(0.005)
Birth month	-0.004	-0.004	-0.003
	(0.006)	(0.007)	(0.006)
Birth month sq	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)
Male	-0.027	0.041	-0.153***
	(0.037)	(0.035)	(0.044)
Father lived in household	-0.259	-0.223	-0.223
	(0.160)	(0.166)	(0.150)
Mother's age	-0.079	-0.045	-0.116
	(0.128)	(0.140)	(0.104)
Mother is married	0.099	-0.019	0.296
	(0.227)	(0.232)	(0.253)
Mother's age on birth of child i	-0.002	-0.017	0.030
	(0.128)	(0.140)	(0.106)
UCT household	-0.354***	-0.347***	-0.218***
	(0.077)	(0.081)	(0.078)
Farming household	-0.023	0.063	-0.188*
	(0.090)	(0.088)	(0.100)
Asset index	0.195***	0.194***	0.114***
	(0.032)	(0.033)	(0.032)
Urban	0.016	0.005	0.031
	(0.130)	(0.128)	(0.148)
Observations	10454	10454	10454
Adjusted R^2	0.195	0.157	0.138

Standard errors, clustered at birth month cohorts, in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

All test scores are standardized using variable means and standard deviation

Table 3.14: *Fixed Effect Estimation of Crisis Exposures on Test Scores ((for Children 7 to 13 years old in 2007 and 2014) and Urban/Rural)*

	Urban			Rural		
	Total score	Basic cognitive score	Math score	Total score	Basic cognitive score	Math score
Months exposed to crisis	-0.014**	-0.013**	-0.009	-0.002	-0.000	-0.006
(including while in utero)	(0.006)	(0.007)	(0.007)	(0.008)	(0.008)	(0.009)
Birth month	-0.008	-0.010	-0.000	-0.001	-0.000	-0.003
	(0.008)	(0.008)	(0.008)	(0.009)	(0.010)	(0.009)
Birth month sq	0.000	0.000	-0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	-0.045	0.024	-0.167***	0.008	0.078	-0.138**
	(0.052)	(0.051)	(0.059)	(0.054)	(0.054)	(0.060)
Father lived in household	-0.131	0.016	-0.373*	-0.425**	-0.513**	-0.066
	(0.241)	(0.252)	(0.203)	(0.207)	(0.211)	(0.198)
Mother's age	0.135	0.243	-0.141	-0.136	-0.141	-0.069
	(0.175)	(0.205)	(0.150)	(0.186)	(0.196)	(0.142)
Mother is married	0.105	-0.239	0.758**	-0.106	0.027	-0.330
	(0.321)	(0.322)	(0.320)	(0.318)	(0.314)	(0.405)
Mother's age on birth of child i	-0.165	-0.246	0.067	0.018	0.034	-0.021
	(0.179)	(0.212)	(0.152)	(0.174)	(0.184)	(0.145)
UCT household	-0.217**	-0.218*	-0.122	-0.490***	-0.478***	-0.307**
	(0.104)	(0.115)	(0.110)	(0.119)	(0.118)	(0.120)
Farming household	0.012	0.083	-0.136	-0.028	0.065	-0.204
	(0.137)	(0.136)	(0.140)	(0.121)	(0.124)	(0.128)
Asset index	0.233***	0.247***	0.107**	0.154***	0.145***	0.108**
	(0.039)	(0.040)	(0.044)	(0.048)	(0.051)	(0.043)
Observations	5866	5866	5866	4588	4588	4588
Adjusted R^2	0.223	0.176	0.173	0.196	0.169	0.127

Standard errors, clustered at birth month cohorts, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
All test scores are standardized using variable means and standard deviation

Table 3.15: *Fixed Effect Estimation of Crisis Exposures by Ages on Test Scores (for Children 7 to 13 years old in 2007 and 2014)*

	Total score	Basic cognitive score	Math score
Months exposed to crisis while in utero	-0.053***	-0.043***	-0.051***
	(0.016)	(0.017)	(0.017)
Months exposed to crisis between 0-11 months of age	0.017	0.005	0.033**
	(0.015)	(0.016)	(0.015)
Months exposed to crisis between 12-23 months of age	-0.033*	-0.029	-0.028
	(0.020)	(0.021)	(0.021)
Months exposed to crisis between 24-35 months of age	-0.007	-0.014	0.010
	(0.017)	(0.017)	(0.017)
Months exposed to crisis above 35 months of age	-0.017	-0.026	0.008
	(0.025)	(0.026)	(0.027)
Birth month	-0.005	-0.012	0.012
	(0.016)	(0.016)	(0.017)
Birth month sq	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)
Male	-0.027	0.041	-0.153***
	(0.037)	(0.036)	(0.044)
Father lived in household	-0.260	-0.225	-0.223
	(0.161)	(0.166)	(0.150)
Mother's age	-0.089	-0.051	-0.129
	(0.130)	(0.141)	(0.105)
Mother is married	0.094	-0.025	0.295
	(0.227)	(0.232)	(0.254)
Mother's age on birth of child i	0.012	-0.008	0.048
	(0.130)	(0.141)	(0.107)
UCT household	-0.362***	-0.353***	-0.225***
	(0.077)	(0.081)	(0.078)
Farming household	-0.022	0.064	-0.188*
	(0.090)	(0.088)	(0.100)
Asset index	0.195***	0.194***	0.114***
	(0.032)	(0.033)	(0.032)
Urban	0.025	0.013	0.038
	(0.130)	(0.128)	(0.148)
Observations	10454	10454	10454
Adjusted R^2	0.196	0.158	0.140

Standard errors, clustered at birth month cohorts, in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

All test scores are standardized using variable means and standard deviation

Table 3.16: *Fixed Effect Estimation of Crisis Exposures by Ages on Test Scores ((for Children 7 to 13 years old in 2007 and 2014) and Urban/Rural)*

	Urban			Rural		
	Total score	Basic cognitive score	Math score	Total score	Basic cognitive score	Math score
Months exposed to	-0.079***	-0.055***	-0.093***	-0.026	-0.033	-0.002
crisis while in utero	(0.020)	(0.021)	(0.020)	(0.026)	(0.026)	(0.028)
Months exposed to crisis	0.004	-0.017	0.045**	0.029	0.026	0.022
between 0-11 months of age	(0.022)	(0.023)	(0.021)	(0.025)	(0.026)	(0.023)
Months exposed to crisis	-0.049*	-0.045	-0.036	-0.023	-0.013	-0.033
between 12-23 months of age	(0.026)	(0.029)	(0.026)	(0.032)	(0.032)	(0.036)
Months exposed to crisis	-0.021	-0.035	0.015	0.004	0.005	0.000
between 24-35 months of age	(0.025)	(0.026)	(0.023)	(0.027)	(0.027)	(0.025)
Months exposed to crisis	-0.045	-0.059	0.002	0.004	0.007	-0.004
above 35 months of age	(0.034)	(0.038)	(0.034)	(0.042)	(0.041)	(0.044)
Birth month	-0.019	-0.032	0.015	0.003	0.006	-0.003
	(0.021)	(0.023)	(0.023)	(0.026)	(0.025)	(0.027)
Birth month sq	0.000	0.000	-0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	-0.042	0.027	-0.166***	0.009	0.080	-0.138**
	(0.052)	(0.051)	(0.059)	(0.054)	(0.054)	(0.060)
Father lived in household	-0.118	0.020	-0.347*	-0.435**	-0.525**	-0.070
	(0.239)	(0.250)	(0.203)	(0.208)	(0.211)	(0.199)
Mother's age	0.124	0.238	-0.159	-0.143	-0.149	-0.069
	(0.180)	(0.208)	(0.157)	(0.188)	(0.198)	(0.144)
Mother is married	0.086	-0.253	0.737**	-0.098	0.031	-0.316
	(0.324)	(0.324)	(0.324)	(0.319)	(0.313)	(0.409)
Mother's age on birth of child i	-0.148	-0.238	0.098	0.027	0.045	-0.021
	(0.185)	(0.216)	(0.157)	(0.176)	(0.186)	(0.146)
UCT household	-0.221**	-0.221*	-0.125	-0.500***	-0.488***	-0.313***
	(0.104)	(0.115)	(0.111)	(0.119)	(0.118)	(0.119)
Farming household	0.023	0.092	-0.127	-0.031	0.063	-0.207
	(0.137)	(0.137)	(0.140)	(0.121)	(0.125)	(0.128)
Asset index	0.233***	0.246***	0.107**	0.151***	0.142***	0.103**
	(0.039)	(0.040)	(0.045)	(0.047)	(0.051)	(0.043)
Observations	5866	5866	5866	4588	4588	4588
Adjusted R^2	0.225	0.176	0.178	0.196	0.169	0.128

Standard errors, clustered at birth month cohorts, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$
All test scores are standardized using variable means and standard deviation

Table 3.17: *Fixed Effect Estimation of Crisis Exposures on Test Scores*

	Farming Households			Non-farming Households		
	Total score	Basic cognitive score	Math score	Total score	Basic cognitive score	Math score
Months exposed to crisis	-0.002	0.005	-0.014	-0.005	-0.010	0.008
(including while in utero)	(0.010)	(0.009)	(0.009)	(0.010)	(0.011)	(0.011)
Birth month	0.024^{**}	0.047^{***}	-0.033^{**}	0.002	-0.008	0.021
	(0.011)	(0.011)	(0.014)	(0.021)	(0.023)	(0.024)
Birth month sq	-0.000	-0.000	0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	-0.002	0.078	-0.163^{**}	-0.076	-0.027	-0.143
	(0.065)	(0.070)	(0.063)	(0.115)	(0.117)	(0.104)
Father lived in household	-0.573^{**}	-0.589^{**}	-0.299	-0.273	-0.411	0.120
	(0.262)	(0.271)	(0.228)	(0.304)	(0.309)	(0.319)
Mother's age	0.085	0.070	0.080	-0.093	-0.049	-0.143
	(0.138)	(0.141)	(0.128)	(0.237)	(0.244)	(0.188)
Mother is married	0.312	0.424	-0.046	-0.236	-0.162	-0.288
	(0.406)	(0.428)	(0.509)	(0.434)	(0.425)	(0.603)
Mother's age on birth of child i	-0.217	-0.241^{*}	-0.076	-0.027	0.002	-0.074
	(0.139)	(0.134)	(0.143)	(0.188)	(0.189)	(0.168)
UCT household	-0.504^{***}	-0.461^{***}	-0.379^{**}	-0.263	-0.285	-0.106
	(0.141)	(0.133)	(0.153)	(0.214)	(0.220)	(0.220)
Asset index	0.129^{**}	0.139^{**}	0.055	0.188^{**}	0.140	0.204^{***}
	(0.057)	(0.057)	(0.055)	(0.080)	(0.092)	(0.073)
Observations	3537	3537	3537	1651	1651	1651
Adjusted R^2	0.209	0.185	0.141	0.238	0.195	0.175

Standard errors, clustered at birth month cohorts, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

All test scores are standardized using variable means and standard deviation

Table 3.18: *Fixed Effect Estimation of Crisis Exposures by Ages on Test Scores*

	Farming Households			Non-farming Households		
	Total score	Basic cognitive score	Math score	Total score	Basic cognitive score	Math score
Months exposed to	-0.003	-0.009	0.010	-0.073**	-0.077**	-0.034
crisis while in utero	(0.028)	(0.027)	(0.029)	(0.034)	(0.035)	(0.036)
Months exposed to crisis	0.037	0.033	0.029	0.042	0.034	0.041
between 0-11 months of age	(0.031)	(0.031)	(0.030)	(0.037)	(0.039)	(0.039)
Months exposed to crisis	0.004	0.010	-0.009	-0.030	-0.012	-0.054
between 12-23 months of age	(0.037)	(0.035)	(0.038)	(0.051)	(0.052)	(0.057)
Months exposed to crisis	-0.000	0.005	-0.011	0.029	0.020	0.034
between 24-35 months of age	(0.028)	(0.027)	(0.026)	(0.035)	(0.037)	(0.034)
Months exposed to crisis	0.034	0.028	0.031	0.014	0.026	-0.015
above 35 months of age	(0.049)	(0.047)	(0.050)	(0.061)	(0.062)	(0.065)
Birth month	0.045	0.061*	-0.006	0.028	0.030	0.013
	(0.033)	(0.031)	(0.033)	(0.042)	(0.044)	(0.043)
Birth month sq	-0.000	-0.000	-0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	0.004	0.083	-0.158**	-0.074	-0.022	-0.147
	(0.067)	(0.070)	(0.064)	(0.115)	(0.116)	(0.103)
Father lived in household	-0.564**	-0.585**	-0.283	-0.280	-0.418	0.116
	(0.262)	(0.271)	(0.228)	(0.307)	(0.312)	(0.321)
Mother's age	0.084	0.067	0.085	-0.088	-0.039	-0.150
	(0.139)	(0.141)	(0.129)	(0.234)	(0.241)	(0.188)
Mother is married	0.335	0.438	-0.016	-0.224	-0.161	-0.258
	(0.410)	(0.429)	(0.519)	(0.435)	(0.425)	(0.606)
Mother's age on birth of child i	-0.215	-0.238*	-0.078	-0.029	-0.002	-0.070
	(0.141)	(0.135)	(0.144)	(0.185)	(0.186)	(0.167)
UCT household	-0.516***	-0.471***	-0.390**	-0.272	-0.295	-0.110
	(0.141)	(0.132)	(0.153)	(0.214)	(0.219)	(0.223)
Asset index	0.125**	0.135**	0.050	0.186**	0.139	0.200***
	(0.056)	(0.057)	(0.055)	(0.081)	(0.093)	(0.073)
Observations	3537	3537	3537	1651	1651	1651
Adjusted R^2	0.210	0.185	0.143	0.240	0.197	0.174

Standard errors, clustered at birth month cohorts, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
All test scores are standardized using variable means and standard deviation

Table 3.19: *Fixed Effect Estimation of Crisis Exposures on Test Scores (excluding in Utero period)*

	Total score	Basic cognitive score	Math score
Months exposed to crisis	-0.009	-0.005	-0.012**
	(0.005)	(0.005)	(0.006)
Birth month	-0.014	-0.003	-0.030**
	(0.011)	(0.010)	(0.012)
Birth month sq	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)
Male	-0.042	0.028	-0.166***
	(0.036)	(0.035)	(0.041)
Father lived in household	-0.253*	-0.237	-0.178
	(0.144)	(0.152)	(0.139)
Mother's age	0.036	0.058	-0.023
	(0.102)	(0.107)	(0.085)
Mother is married	0.130	0.007	0.323
	(0.231)	(0.238)	(0.279)
Mother's age on birth of child i	-0.117	-0.131	-0.038
	(0.105)	(0.110)	(0.090)
UCT household	-0.284***	-0.263***	-0.205**
	(0.088)	(0.092)	(0.080)
Farming household	-0.029	0.052	-0.181*
	(0.093)	(0.088)	(0.099)
Asset index	0.192***	0.197***	0.102***
	(0.031)	(0.033)	(0.029)
Urban	0.023	-0.003	0.066
	(0.121)	(0.121)	(0.145)
Observations	11781	11781	11781
Adjusted R^2	0.191	0.154	0.137

Standard errors, clustered at birth month cohorts, in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

All test scores are standardized using variable means and standard deviation

Table 3.20: *Fixed Effect Estimation of Crisis Exposures on Test Scores (excluding in Utero period and Urban/Rural)*

	Urban			Rural		
	Total score	Basic cognitive score	Math score	Total score	Basic cognitive score	Math score
Months exposed to crisis	-0.011	-0.010	-0.010	-0.002	0.003	-0.011
	(0.008)	(0.008)	(0.009)	(0.009)	(0.009)	(0.009)
Birth month	-0.034***	-0.025**	-0.036***	0.018	0.029**	-0.012
	(0.011)	(0.011)	(0.013)	(0.015)	(0.014)	(0.014)
Birth month sq	-0.000	-0.000	0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	-0.063	0.009	-0.182***	-0.023	0.049	-0.159***
	(0.049)	(0.049)	(0.055)	(0.052)	(0.053)	(0.058)
Father lived in household	-0.084	-0.009	-0.199	-0.452**	-0.515***	-0.134
	(0.209)	(0.220)	(0.196)	(0.191)	(0.198)	(0.176)
Mother's age	0.110	0.195	-0.110	0.020	0.014	0.025
	(0.172)	(0.199)	(0.142)	(0.121)	(0.123)	(0.103)
Mother is married	0.059	-0.218	0.597*	0.092	0.160	-0.084
	(0.307)	(0.323)	(0.331)	(0.281)	(0.272)	(0.419)
Mother's age on birth of child i	-0.118	-0.182	0.060	-0.155	-0.153	-0.094
	(0.177)	(0.211)	(0.141)	(0.123)	(0.122)	(0.113)
UCT household	-0.145	-0.136	-0.103	-0.391***	-0.365***	-0.278**
	(0.116)	(0.134)	(0.110)	(0.121)	(0.122)	(0.115)
Farming household	-0.046	0.034	-0.187	0.031	0.104	-0.129
	(0.155)	(0.152)	(0.144)	(0.121)	(0.127)	(0.121)
Asset index	0.226***	0.247***	0.087**	0.145***	0.136**	0.100**
	(0.039)	(0.041)	(0.039)	(0.048)	(0.053)	(0.041)
Observations	6593	6593	6593	5188	5188	5188
Adjusted R^2	0.210	0.165	0.165	0.201	0.174	0.126

Standard errors, clustered at birth month cohorts, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
All test scores are standardized using variable means and standard deviation

Chapter 4

Religion and Female Autonomy in Indonesia

4.1 Introduction

Greater female autonomy has been argued to improve demographic and socioeconomic indicators and it has been associated particularly with improvements in the outcomes of children. Research by Adato et al. (2000), Beegle et al. (2001), Binder (1999), Iyigun and Walsh (2007), Maitra (2004), and Thomas (1994) has shown that mothers' control of resources leads to improvements in children's health and education outcomes. Nevertheless, despite the increase in women's status in the past 100 years, gender disparities still prominently persist in many societies, particularly so in developing countries. The substantial gap in status between the men and women has created an imbalance of power not only outside of households but also inside the households that the women are a part of. However, these imbalances in status differ across countries due to differences in political systems, economic conditions, and cultural and religious practices. There have been many studies examining the determinants of female autonomy, including the role of religion in shaping this autonomy (Borooah and Iyer, 2005; Chattopadhyay and Goswami, 2007; Jejeebhoy and Sathar, 2001). This study will contribute to the existing literature by examining the role of religion, specifically religiosity, on women's status in Indonesia.

Given the above-mentioned positive benefit of female autonomy, understanding the underlying causes that influence intra-household female bargaining power has become an important research topic. Kinship norms (Fricke et al., 1986; Rammohan and Johar, 2009), relatively low return for female labor (Bardhan, 1988), and women's economic status (Browning and Chiappori, 1998) are among the factors that are thought to influence female autonomy within the household. Some studies have also tried to link religion to female autonomy (Karim, 1992; Mason and Smith, 2000). Nevertheless, these studies use only *religion* as their variable of interest. In contrast, this study examines the link between *religiosity*, which measures the intensity of of religious behaviors and beliefs, and married women's autonomy within households in Indonesia.

Furthermore, this study will try to establish *causality* between religiosity and women's status. Guiso et al. (2006) recommend three steps to establish the link between religion and economic outcomes. The first is the need to understand how religiosity affects cultural outlooks and preferences. This is followed by examination of how these preferences influence economic outcomes. And the third is to identify the direction of causality between the two. Thus, the goal of this study is to estimate the causal impacts by using instrumental variable (IV) methods to avoid bias due to the endogeneity of religiosity. Five instrumental variables will be used. They are: co-religion education, non-co-religion education, community self-assessment measures of religiosity, community praying behaviors, and share of village population of one's own religion.

Indonesia also provides an interesting case study for this topic as the country has experienced dynamic changes in the role and capacity of women inside and outside of the household over several decades of economic development, while at the same time the country has experienced an increase in religious intensity in the two decades since the 1997 Asian Financial crisis (Chen, 2010; Mazumdaru, 2017).

The rest of this chapter will be structured as follows. The next section will explore the current literature on intra-household bargaining power and religiosity. This will be followed by an explanation of the empirical strategy, which includes a description of the data that will be used in the study. The last two sections will present the findings and conclusions of the study.

4.2 Literature Review

4.2.1 Determinants and Consequences of Female Autonomy

The traditional view of household behavior was established by Becker (1965), who developed a unitary household model to examine household decision-making processes. Under this assumption, a household's behavior can be represented by an individual household member's behavior, who makes decisions for the entire household (Haddad et al., 1997; Rosenzweig and Stark, 1997). However, subsequent empirical research in both developed and developing countries on intra-household bargaining has challenged this unitary household model. These empirical studies have instead pointed out the possibility that a bargaining process determines household decision-making. The research in this area has been mostly examined how women's status and preferences relative to their partners' has influenced households' socioeconomic behaviors and outcomes.

Why is understanding the distribution of power within the household important? An improvement in women's bargaining power has been attributed to improvements in the education, health and general welfare of children. Maitra (2004) shows that control of resources in the hands of women increases health care usage in India. Beegle et al. (2001) show that differences in prenatal and delivery care for children in Indonesia are influenced by the relative autonomy of the mother in the household. Female autonomy has also been shown to influence households' expenditure patterns (Quisumbing and Maluccio, 2003). This is why programs such as Conditional Cash Transfer (CCT) programs require that the cash payments be delivered *specifically* to mothers.

Despite a general agreement on the positive linkage between women's status and households' demographic and welfare outcomes, part of the challenge in these studies is to understand the mechanisms and identify the factors that have shaped this bargaining power. Many empirical and theoretical studies have tried to better understand what determines intra-household bargaining power. Manser and Brown (1980), McElroy (1990), and Lundberg and Pollak (2003) have examined how a bargaining process between individuals in some households resulted in household decisions. Chiappori (1988, 1992) shows how households achieve efficiency in resource allocation through a series of repeated interactions between individuals within the household. McElroy (1990) recommends using what she calls extra-household environmental parameters (EEPs), describing an individual's socioeconomic endowments in the case of household disbandment, as useful candidates for intra-household bargaining power measures, while Kabeer (1999) provides a philosophical exposition on the conceptualization of women's rights and empowerment.

For empirical research, another challenge is in converting the theoretical notions into measurable indicators of power within households. This is because the concept of power is a multidimensional one. Some studies have used education, employment status and age differences between spouses as proxies for female's autonomy (Dharmalingam and Philip Morgan, 1996; Dyson and Moore, 1983; Heaton et al., 2005). This study will follow Basu and Amin (2000) in defining women's status as exposure to the outside world, physical mobility in the community and decision-making power within the household.

4.2.2 Religion, Religiosity and Female Autonomy

Religion influences many aspects of the daily lives of a large fraction of world's population. In contrast to the popularity of religion as a topic of interest in sociology, psychology and medicine, relatively few studies have attempted to link religiosity to economic outcomes or vice versa. The few economic studies that do exist have found that religious people engage in less risky health behavior and less criminal behavior, have better self-reported measures of well-being, and have more marital stability. One major concern regarding the research in this area is in establishing the causal impact of religiosity on these economic behaviors due to the systematic difficulties in disentangling religiosity effect with other factors which might also influence the economic variable of interest. Iannaccone (1998) implicitly points out that this observed relationship might stem from the overlap of preferences for religiosity and these economic outcomes instead of direct causal impact of religious participation on these outcomes.

Iannaccone (1992) provides one of the most frequently employed models of religious adherence. This model was used by Hungerman (2014) to examine the importance of religious adherence in influencing the economic behavior of the highly religious. Another paper by Gruber (2005) provides an interesting method to create a useful instrumental variable to overcome the endogeneity problem of using religiosity as a control variable. Using US General Social Survey (GSS), Gruber created a religious market density that is formed based on ancestral mix. The market density is constructed using the religious preference of a person ancestral heritage (e.g. Irish ancestry and Catholicism) with respect to the religious preference of other heritages that live in the same neighborhood (e.g. Germanic ancestry and Protestantism).

Only a few studies on Indonesia have linked religiosity to economic outcomes. Among these is a study by Chen (2010), who uses data from the Hundred Villages Survey. He finds that the 1997 Asian Financial crisis that hit Indonesia has increased religious intensity in that country. He further notes that the increased religious fervor in Indonesia due to the economic crisis persisted even after the economy has reached its relative normalcy in the early 2000s.

Related to female autonomy, there exists an extensive literature examining the link between religion and women's autonomy. Obermeyer (1994) compares the impact of religion (Islam) on female fertility decisions (a common proxy for female autonomy) between Tunisia and Iran. He concludes that the fertility decisions are largely determined by the political situation instead of adherence to religious rules. In a similar vein, Cain et al. (1979) argue that patriarchy in any society is influenced jointly by kinship, political and religious factors. However, studies by Bhat and Rajan (1990), Drèze and Murthi (2001), Dharmalingam et al. (2005), Kulkarni and Alagarajan (2005), and Chattopadhyay and Goswami (2007) show differences in fertility decisions (and hence women's status) between different religions, which implies a more definitive role of religion on influencing fertility decisions. Most of these studies, however, focused on South Asia.

A few studies connecting religion and female autonomy have also been conducted in Southeast Asia. Mason and Smith (2000), in their study of Malaysia, find that Malaysian women have the highest level of freedom among five Asian countries. A study by Rammohan and Johar (2009) that examines the determinants of female autonomy in Indonesia includes religion as one of its explanatory variables. However, all of these studies have used only differences in religion as their variable of interest, instead of religiosity. In the context of Indonesia, where affiliation to a certain religion is almost enforced (most documents require statement of religious affiliation and hence have legal ramifications, such as for marriage and inheritance), statements of religious affiliation do not necessarily imply religious adherence. Thus, in contrast to the above studies, this study will use religious *adherence* variables to examine the relationship between religiosity and female autonomy.

There are not many studies that have examined the role of religiosity and women's status within the household. One such study is by Agadjanian and Yabiku (2015) who examine the role of religious participation (e.g. frequency of church attendance) in women's autonomy in Mozambique. However, there has been no such study conducted for Indonesia. Furthermore, most of these studies do not address the endogeneity problem and provide only correlations between religion or religiosity and women's status. Thus this study differs from the above research by focusing specifically on religiosity and trying to establish causality between religiosity and female autonomy by using IV methods.

There is good reason for thinking that religiosity might be related to women's status in the household. Although the interpretation and the implementation are often disputed and varied by the different religions or religious denominations, almost all major religious groups have a set of defined rules dictating the relative roles of husband and wife within a household. One example is from Quran "Men are overseers over women because God has given the one more strength than the other, and because men are required to spend their wealth for the maintenance of women..."(Quran, 4:34). Another example is from the Bible which states "And I do not permit a woman to teach or to have authority over a man, but to be in silence. For Adam was formed first, then Eve. And Adam was not deceived, but the woman being deceived, fell into transgression..."(I Timothy 2:12-14). Given these sets of rules, and how much religiosity plays an important role in many people's lives, understanding how adherence to these rules is linked to women's autonomy within the household could provide new insights into this issue. In particular, since some religious practices have often been cited as preserving patriarchy in society by many in the popular media (e.g an article by Barber (2012)).

4.3 Empirical Framework

The data that will be used in this paper come from the 2007 and 2014 rounds of the Indonesia Family Life Survey (IFLS4 and IFLS5, respectively). The IFLS data are longitudinal. This survey has been conducted by the RAND Corporation since 1993, with the cooperation of a private or university affiliated local survey agency. Currently, there are six waves of the data (1993, 1997, 1998, 2000, 2007, and 2014), however only five waves are available publicly (1993, 1997, 2000, 2007, and 2014). The IFLS contains rich data on economic and non-economic indicators, including information on consumption, income, assets, education, migration, labor market outcomes, fertility, household decision making processes, income transfers and community participation. The survey sample represents around 83 percent of the population of Indonesia. When first implemented in

1993, it collected data from 13 of the country's 26 provinces.[1] The survey continues to be expanded; the most recent IFLS includes some provinces in Eastern Indonesia which were previously not surveyed. Another major advantage of the IFLS is that it also contains extensive community level data. These community level data record various types of information on the community, from economic conditions to traditional law and customs of the community. For these data, various community leaders (religious, political and social) were interviewed to provide the general picture of the community.

This study will thus use both the household and community level data of the IFLS4 and IFLS5. In particular, this study will exploit new questions that were added to IFLS4 and IFLS5 which ask about household religiosity, including a set of specific questions on religious adherence for various religions in Indonesia. This study will thus use specific questions on adherence to a specific religion to construct the religiosity variables. Indonesia officially acknowledges five major religions (Islam, Christian, Catholic, Buddhism, Hindu) and Confucianism. Due to the small number of individuals in the sample identifying with Buddhism and Confucianism (less than 0.5 percent of the sample), this paper will exclude these two groups from the analysis.

4.3.1 Measures of Married Women's Autonomy

Following Rammohan and Johar (2009) and Majlesi (2016), the dependent variable measuring women's autonomy will focus on the responses of *married women.* Women's autonomy is defined as the extent to which women participate in var-

[1]After the 1998 economic and government reformation brought about by the 1997 Asian Financial Crisis, as part of the decentralization process, the number of provinces in Indonesia, as of 2017, has increased to 34.

ious decisions in their households. Starting with the 1997 round, the IFLS has included several questions, which were expanded in subsequent surveys, regarding decision-making in the household. These questions in IFLS4 and IFLS5 include decisions regarding: (1) expenditure on food; (2) choice of food; (3) routine household purchases; (4) individual's own clothing; (5) spouse's clothing; (6) children's clothing; (7) children's education; (8) children's health; (9) expenditures for large purchases of durable goods (such as a TV); (10) money transfers to parents; (11) money transfers to parents-in-law; (12) expenses for wedding or party gifts; (13) money for *arisan*[2] (informal saving lottery); (14) saving; (15) spouse's time allocated for socializing; (16) own time allocated for socializing; (17) own or spouse's work; and (18) the use of birth control. The direct measure of women's status within their households will thus be constructed using these questions on decision-making.

The literature on women's autonomy has used different methods to transform these questions on decision-making power into measures of female bargaining power. This study will follow Majlesi (2016), who defines female bargaining power within household as the number of household decisions that the woman has power on *minus* those that the husband has power on. To create a dependent variable from the decision-making questions, a dummy variable is created first by assigning value of *1* if the woman participated, either alone or jointly with her husband or other family members, in the decision of a particular category (e.g.

[2] *Arisan* is a women's saving lottery group. Many women in Indonesia join these groups for socializing purposes. During the meetings, each member will have to contribute a certain agreed amount of money to the money pool. Then, a lottery was drawn to determine the recipient of the money pool for that particular meeting. The winner is expected to be the host for the next meeting. A woman can join as many *arisan* groups as she wants. For each *arisan*, the frequency of meeting per year will vary, from as frequent as biweekly to as rare as once per year.

expenditure on food from Question 1), and 0 otherwise. Then, these numbers from all 18 questions will be added to provide the total decision-making spheres that the woman has power on. Thus, if she has power on all spheres, the total value should be equal to 18. A similar method is conducted for the husbands. The final measure is derived by subtracting the husband's total value from wife's total value. Thus, this measure ranges between -18 to $+18$, i.e. from wife having *no* power at all to wife having all of the *full* power. Note that value of zero denotes equal relative power between husband and wife. Because changes in total decisions that the wife has purview on may not necessarily imply an increase in bargaining power, as some decision spheres may be more important than the rest, five categories are created to provide a comparison between different decisions' aspects. The five categories are: routine household decisions (Questions 1 to 5), child related decisions (Questions 6 to 8), non-routine economic decisions (Questions 8 to 14), time use decisions (Questions 15 to 17) and fertility decisions (Question 18).

Tables 4.1 and 4.2 show the summary statistics for the decision-making variables for full cross-section samples in 2007 and 2014 and for the panel sample, respectively. The tables show that, in general, the women in the sample have quite high decision-making power, especially on routine household decisions, which is expected due to the perceived traditional role of women in the household. Around 36 or 37 percent of women in 2007 state that they do not have to discuss their own time for socializing with their husband. This number increased to around 53 percent for the full sample and 55 percent for panel sample in 2014. This implies that many women have significant power to decide on how best to use their own time without any interference from either their husband or other household members. Note that, in 2007, most decisions on non-routine household expenses were decided jointly with the husband. Only a small percentage of women in 2007 stated that they can decide on non-routine household decisions on their own without having to discuss it with other family members. However, this number increased dramatically in 2014. For example, only around 8 percent of women in 2007 stated that they have "sole-decider" power to decide on money transfer to their own parents. By 2014, this number had increased to more than 20 percent. A similar trend can be seen in different decision sub-categories. There are two possible reasons for this increase. The first is that changes in socioeconomic and political conditions may influence female bargaining power (e.g. an increase of women's participation in political parties). The second is that older women have higher power in household decisions.

One issue, however, arises from using the questions on decision-making power from the IFLS. It is not clear whether the women were interviewed separately from the their husband. Only around 19 percent of women in 2007, 21 percent in 2014, had the interview without the presence of other household members. Therefore, in addition to the above measure, women's status will also be measured by the share of household assets owned by the wife (all assets and non-liquid assets), current use of contraception, having job, and number of *arisan* groups joined in the previous year. These indirect measures will thus act as supporting evidence in the empirical estimations.

In regards to share of household assets, Table 4.3 shows that most women own between 40 percent to more than 74 percent of household assets in 2007. Of all the assets, ownership of jewelry is dominated by women. It needs to be noted that the husbands still hold a higher share of non-liquid assets, such as houses and land. In 2007, women held around 48 percent of house ownership, and this decreased to 45 percent in 2014. Similarly for non-farm land, women held around 47 percent of ownership in 2007 that, again, decreased to 43 percent in 2014. Unlike the decision-making variables that show general positive trends in decision-making power, asset variables show a more mixed result, with some higher in 2014 (such as for jewelry and receivables), while others are lower (such as vehicle ownership). For estimation purposes, an average of wife's ownership of *all* household assets and *non-liquid* households assets will be used. The assets that are considered as non-liquid are: house, other house, and land.

Lastly, Table 4.4 shows the summary statistics for the rest of the indirect measures of female autonomy. Almost 60 percent of women used birth control in both periods. Most women were also employed, almost 60 percent in 2007 and more than 60 percent in 2014. Many women did not join any *arisan* in 2007, as shown by the mean of number of *arisan* groups participated in during last year (0.573 for the full sample and 0.576 for the panel sample). This number however increases in 2014, where women in general joined at least one *arisan* group.

4.3.2 Measures of Religiosity

Starting in 2007 (IFLS4), new questions were added to the IFLS regarding religious adherence for all the acknowledged religions or philosophical systems in Indonesia. Each respondent was asked to choose between Islam, Catholicism, Protestantism, Hinduism, Buddhism and Confucianism as their religious affiliation.

For the religiosity measures, each respondent was asked to give a self-assessment of their degree of religiosity. The degree is a four point scale measure: *1. not* *religious; 2. somewhat religious; 3. religious; and 4. very religious.* In addition to this self-assessment measure, the surveys also have additional questions on respondents' religious adherences according to their respective religion. For example, the questions for Christians include whether they go to church or read the Bible, while the questions for Muslims include whether they eat Halal food (food that is prepared according to Islamic law) or how many times they pray every day. These assessment questions provide relatively more objective measures of religious piety and thus will be used as another measure of religiosity. Because the questions on religious adherence have different scales across different religion, the variable denoting religiosity is standardized for each religion to allow comparison of religiosity across these different religion.

Table 4.5 provides summary statistics for religiosity, including summary statistics separately for each religion. The table shows that, in general, the women in the sample are quite religious, as shown by the standard deviation of self-assessed religiosity at 0.110 in 2007 and 0.091 in 2014. Similarly, for the more objective religiosity measure (religious practice variable), the standard deviation is at 0.047 in 2007 and 0.075 in 2015. Note that the two measures of religiosity show different trend of religiosity between the two IFLS rounds. By self-assessed religiosity measure, religiosity has decreased between 2007 to 2014. However, using religious practice variable, religiosity appears to have increased between the two rounds. This provides an interesting comparison between the two measures in the estimations.

4.3.3 Identification Strategy

The main variables of interest for this study are religiosity, religion, and married women's autonomy. The general equation to be estimated is:

$$A_{iht} = \alpha + \beta R_{iht} + \eta X_{iht} + \epsilon_{iht} \tag{4.1}$$

where A_{ih} denotes the relative measure of woman i's autonomy within household h at time t, while R and X respectively represent *religiosity* and control variables. OLS estimates of Equation (1) are unbiased if ϵ_{iht} is uncorrelated with R_{iht} and X_{iht}, which is unlikely to hold.

To exploit the panel nature of the data and to correct for unobserved time-invariant household characteristics, which can lead to bias in OLS estimates, fixed-effect estimation will also be conducted. The equation to be estimated is:

$$A_{it} = \alpha_i + \beta R_{it} + \eta X_{it} + \epsilon_{it} \tag{4.2}$$

where A, R, and X are defined as the above, and α_i is an individual-specific fixed effect. Fixed-effect estimation thus controls for unobserved differences between households, such as parental education or family norms.

As stated before, simple OLS estimates of equation (1) are unlikely to provide unbiased estimates of the causal effect of religiosity on women's autonomy due to correlation between the error term and the observed variables in Equation (1). Although the fixed-effect estimation in Equation (2) avoids bias due to unobserved differences between households that do not change over time, it does not avoid bias due to unobserved factors that change over time and are correlated with the observed variables. For example some time-varying unobservable variables can influence both religiosity and women's autonomy simultaneously, such as an improvement in local economic conditions that may influence both religiosity and female autonomy.

One approach to avoid this type of bias is to use instrumental variable estimation. The estimating equation using instrumental variable(s) is:

$$A_{iht} = \alpha + \beta R_{iht} + \eta X_{iht} + \epsilon_{iht} \tag{4.3}$$

$$R_{iht} = \delta + \gamma Z_{iht} + \theta X_{iht} + \omega_{iht} \tag{4.4}$$

where A, R, and X are defined as the above, and Z is an instrumental variable for the religiosity variable, R.

For an instrumental variable (IV) to produce consistent estimates, it must satisfy two conditions. First, the instrument must be uncorrelated with the error term of the structural equation of interest (the *exclusion restriction*). That is, the instrument must influence the dependent variable *only* through the variable that is instrumented. Second, the instrument needs to satisfy the partial correlation requirement, that is the instrument must have explanatory power for the instrumented variable after conditioning on the other variables in the structural equation. Considering these two requirements, this study proposes three variables for instruments.[3]

The three proposed IVs represent community-level religiosity. People who live in a generally religious community tend to be more religious, either because of

[3]Initially, nine variables were considered for the IVs. The three variables that have the strongest results in terms of their statistical significance level were retained. Note that given the number of estimations conducted, there is no combination of IV that passes the overidentification test for *all* estimations. Thus, what is being presented here are the best results among all of the estimations. The other six instrumental variables that failed the IV tests are: co-religion education, non-coreligion education, routine religious activities in the village, religious leaders can resolve land conflicts, and religious leaders can solve community conflicts, and share of own religion in the village.

higher exposure to religiosity or because of social pressure to be more religious. The first two IVs are created by taking the community level average of individual religiosity from household-level data. Because religiosity tends not to change for the older population, the average is constructed using only the religiosity of the population 50 years and older. Because this study uses two different measures of religiosity at the individual level (self-assessment and praying behavior, or praying frequency if Muslims), community-level religiosity will be constructed separately for both types of individual-level religiosity. Because these community-level variables are derived from the individual-level religiosity data, they have the same scale as the individual-level variables. For example, the scale for the community-level self-assessment of religiosity is still from 1 to 4, the same as individual-level religiosity variable. In addition to this two IVs, the last IV to be used is a dummy variable denoting whether more than 75 percent of village population participated in religious activities. This variable is constructed using community level data that provides information on community participation in various activities in the village.[4] Table 4.6 shows summary statistics for all IVs. The table shows that most community members age 50 years or older are quite religious. Around 50 percent of the sample also live in villages where more than 75 percent of the population participates in religious activities.

Some notes regarding the estimations. The estimation will be conducted only

[4]The original question on the proportion of the village population who participate in religious activities was coded for three possible responses: 1. less than 25 percent; 2. between 25 to 75 percent; and 3. more than 75 percent. Because the category 1 is the least common, this question was then used to create a dummy variable with value of 1 if more than 75 percent of village population participated in religious activities, and 0 otherwise. Estimations, not presented here but available from the author upon request, were also conducted using the categorical variable, and they give similar results to the estimations that use the dummy variable.

for married women whose husbands are still alive and who live in the same household as the woman. This restriction is important to allow for the construction of the relative measures of autonomy, as it compares the power between wife and husband. Given the small number of husbands living outside of the household (2.2 percent of the 2007 sample and also 2.2 percent for the 2014 sample), dropping these observations is unlikely to lead to selection bias. Second, because almost 90 percent of the sample is Muslim, the same estimations will also be conducted using only the Muslim population. In addition, all estimations will be clustered at the village level. Given that some households moved out of their 2007 village between 2007 and 2014, fixed effect estimations will be clustered using the 2007 village code to allow for clustering in the estimation.[5] Third, because the IVs are constructed using above 50 years old population, the estimations are conducted only for women below 50 years old. Estimations using the complete female sample were also conducted for comparisons. Lastly, all estimations are conducted with control variables that will be discussed in the next sub-section.

4.3.4 Control Variables

Table 4.6 also shows the summary statistics for the control variables used in the regression analysis. The control variables include various individual and household characteristics, such as age, education, employment status, religion and household size. The household characteristic variables show that, in general, both wives and husbands have at minimum primary education (6 years), as shown by the mean for years of education of more than 8 years. For the full sample, the

[5]Fixed-effect estimations are also conducted using the 2014 village code for clustering to check the robustness of the results. Because the results are almost identical, only the results using the 2007 village code are presented.

average age for the wives is almost 38 years old in 2007 and more than 38 years in 2014; while for the panel sample, the average age for the wives is around 36 in 2007 and almost 43 in 2014. The mean age of the husbands is slightly higher in both years, almost 43 years old in 2007 and more than 43 years old in 2014 using the full sample; or almost 41 years old in 2007 and almost 48 years old in 2014 using only the panel sample. In terms of family size, most households in the sample have around six members. Most of the husbands were also employed, more than 92 percent in both years.

Reflecting Indonesian culture, families tend to include extended family members, so variables denoting whether the women live with their own parents or parents in-law are included as control variables. Table 4.6 also shows that most women live with neither their parents nor their parents-in-law, almost 76 percent in 2007 and 2014 using the full sample, and 76 percent in 2007 and 85 percent in 2014 using only the panel sample. Given the average age of these women, many of their parents are no longer alive. Interestingly, if the couple decided to live with either parents or parents-in-law, most lived with the wife's parents instead of the husband's parents. Most households also have one or two children who are less than 15 years old. In terms of community characteristics, around 50 percent of sample lived in urban areas in 2007, which increases to 57 percent in 2014. More than 55 percent of the sample lives in Java.

Because the Indonesian population consists of many different ethnicities with various kinship norms, variables on kinship norms will also be included. These variables are also included to account for the fact that Indonesia has the "world's largest matrilineal society" which mostly comes from *Minangkabau* ethnicities (Lam, 2016). The kinship norms variable is constructed using a specific question from the community level data in the 2007 IFLS. This survey round includes a specific module on local customs and norms. One of the questions posed is the local custom regarding of residence after marriage.

Following Rammohan and Johar (2009), this variable will be used to construct three kinship norm variables: uxorilocal, patrilocal and ambilocal kinship norms. Under uxorilocal kinship norms, couples will generally reside with or near the parents of the wife. The daughter essentially brings male labor into the family through marriage. Conversely, in patrilocal kinship norms, couples will reside with or near the parents of the husband. In ambilocal kinship norms, couples can live near either set of parents. In the estimation, the uxorilocal kinship norms will act as the base to allow for its comparison with patrilocal and ambilocal kinship norms. From Table 4.6, it can be seen that more than 50 percent of women live in areas with uxorilocal kinship norms. Note that these kinship norms variables are available only for the 2007 IFLS. Because customs are usually slow to change, the same module will also be used to create kinship norm variables for the estimations using the 2014 IFLS. Therefore, these variables will be omitted for fixed-effect estimations of religiosity on female autonomy.

4.4 Empirical Results

The results will be presented in two parts. The first part will present the main estimation results of the impact of religiosity on married women's autonomy within their households. The second part will provide some robustness checks of the main results.

4.4.1 Main Estimation Results

Tables 4.7, 4.8 and 4.9 provide the estimation results on decision-making power measure of women's autonomy using the two different measures of religiosity, self-assessment and religious practice (note that the estimated effects of the control variables are presented in Appendix Tables B1 to B10). The OLS estimation results in Table 4.7 indicate that religiosity generally has a relatively weak statistical relationship with the decision-making variables in 2007. The estimated impact of religiosity (self-assessment) on women's autonomy is marginally significant in only in one of the six regressions. It is negatively correlated with the time-use decisions variable at only the 10 percent statistical significance level. The estimated impact of religious practice, however, show stronger negative impacts in two out of six regressions (non-routine household decisions at the 1 percent level and time-use decisions at the 5 percent level). Neither of the religiosity variables (self-assessment and religious practice) has a significant estimated impact on the aggregated autonomy measure.

In contrast, the estimations using the 2014 IFLS are noticeably stronger, especially for self-assessed religiosity; the estimated negative impacts are statistically significant for four of the six regressions, including the aggregated autonomy variable. Yet, the estimated impact of the religious practice variable is negative and statistically significant for only three of the six variables: child-related decisions (with a coefficient of -0.054 that is significant at the 5 percent level), time-use decisions (with a coefficient of -0.023 that is significant at only the 10 percent level) and fertility decisions (with a coefficient of -0.024 that is significant at the 5 percent level).

As noted in the previous section, the OLS estimates are likely to be biased due to unobserved heterogeneity, so fixed-effects and instrumental variable estimates, which are two methods to reduce this bias, merit serious consideration. Table 4.8 reports the estimated impacts of religiosity on female autonomy for the fixed-effect specification in equation (2). Only one of the 12 estimated impacts is statistically significant, and only at the 10 percent level. More specifically, the estimated impact of religious practice variable is negative on time-use decisions. Given these results, one can conclude that these fixed-effect estimation results do not support the hypothesis that religiosity has a negative impact on female autonomy in Indonesia.

As explained above, fixed-effects estimates could be biased if unobserved heterogeneity varies over time. Moreover, fixed-effect estimates may be particularly susceptible to bias toward zero if the explanatory variable is measured with errors. Thus, the final set of estimates, shown in Table 4.9, attempt to overcome this limitation by using instrumental variables. Before turning to the estimation results, consider first the first-stage estimation results, which are provided in Appendix Table B1 and B10. The first-stage estimation results (presented in Appendix Table B21 and B22) show that, in general, the instrumental variables are correlated with the religiosity variables. Although the three IVs are not always statistically significant in all estimations, the F-statistics, which are shown in Table 4.9 are all above 10 in both the 2007 and 2014 estimates. This suggests that there are no serious problems of weak instruments. In addition to this, the instruments fail the overidentification test in 3 out of 12 cases for the estimations that use the 2007 IFLS; and 1 out of 12 cases for the estimations that use the 2014 IFLS (see Table 4.9). This suggests that the IV estimates perform quite well in both years. Thus, the IV results merit some discussions.

The estimation results of the impact of self-assessed religiosity on female autonomy for the 2007 data show no statistically significant results of self-assessed religiosity on female autonomy. It shows negative and statistically significant results for the estimates on the aggregated autonomy measure (at the 5 percent level), routine household decisions (at the 10 percent level) and non-routine household decisions (at the 1 percent level). All three of these IV estimates also passed the overidentification test, and their F-statistics are greater than 10. These estimates show that one standard deviation increase in self-assessment religiosity variable will reduce the aggregate autonomy variable by 0.863 points. Given the standard deviation of the aggregate autonomy variable (4.1), this coefficient value of 0.863 is quite significant (a ”size effect” of about 0.2).

The IV estimates using the 2014 show that religiosity (self-assessed) has negative impacts on aggregate measure, child-related decisions, and routine household decisions. All are statistically significant at the 1 percent level. The results show that an increase in religiosity by one standard deviation reduces aggregate measure by 1.821 points, reduces child-related decisions by 0.488 points, and reduces routine household decisions by 1.030 points. These estimates quite large considering the standard deviation of the three variables are 2.8 for aggregate measure, 0.7 for child-related decisions, and 1.9 for routine household decisions. Self-assessed religiosity also has negative impact on fertility decision by 0.087, but it is only marginally statistical significant at the 10 percent level. The estimates for religious practice are also statistically significant for aggregate measure, child-related decisions, routine household decisions, and fertility decisions. However, IV estimate for routine household decision fail the overidentification test.

The IV estimated impacts show that religious practice has negative impacts on aggregate measure by 1.315 points (at the 1 percent level), on routine household decisions by 0.346 points (at the 1 percent level), and on fertility decisions by 0.087 points (at the 5 percent level).

Recall that most women were interviewed in the presence of other household members. Because of this, there is a potential problem of inaccuracy in the answers to these questions. Thus, estimations of religiosity on indirect proxies of female autonomy are also conducted to provide the supporting evidence for the decision-making power estimates. The estimation results of religiosity on the indirect proxies of female autonomy (current use of birth control, number of *arisan* groups joined, number of *arisan* meetings attended, wife's shares of *all* household assets, wife's share of *non-liquid* household assets and currently employed) are presented in Tables 4.10, 4.11 and 4.12 (the results for control variables are in Appendix Table B11 and B20). The OLS estimation results in Table4.10 show that the self-assessed religiosity estimates are highly statistically significant only for the number of *arisan* groups variable in 2007 (at the 1 percent level). Contrary to expectations, the self-assessed religiosity has a *positive* estimated impact on the this *arisan* variable. The self-assessed religiosity also has estimated negative impacts on wife's shares of all and non-liquid household assets, but only marginally at the 10 percent level. None of the religious practice estimates are statistically significant. Using the 2014 data, self-assessed religiosity estimate is only marginally significant at the 10 percent level for the fertility decisions variable. Again, none of religious practice estimates are statistically significant in 2014. Overall, the 22 OLS estimates in Table4.10 show almost no impact of religiosity on these proxy variables, with the possible exception of *arisan* meetings attended. Since this estimates are likely to be biased, it is best to focus on the fixed-effect and instrumental variable estimates.

The fixed effect estimation results (Table 4.11) of religiosity on indirect proxies of female autonomy are relatively consistent with the fixed effects estimations of religiosity on decision-making variables. Out of 10 estimates, the estimated impact of self-assessed religiosity on current use of birth control variable and of religious practice on wife's shares of all household asset variable are marginally significant, at the 10 percent level. Given that there are 10 estimates in this table, this statistically significant results could be due to random chance. Thus, the fixed effects estimates provide little or no support to the hypothesis that women's religiosity has a negative effect on their autonomy.

Turning to the IV estimation results in Table 4.12, the F-statistics in all regressions are above 10 (again, the first stage estimation results are presented in Appendix Table B21 and B22). Thus, there do not seem to be any problems of weak IVs in the estimations. In terms of the overidentification test, 9 of the 12 estimates passed the test for the 2007 IFLS data; and 8 of the 10 estimates passed the test for the 2014 IFLS data. Thus, consistent with the estimation results in Table 4.9, the IV estimates in Table 4.12 also merits further examination.

Comparing the two years of IFLS data (2007 and 2014), self-assessed religiosity has negative impact on wife's shares of non-liquid assets that is significant at the 5 percent for the 2007 IFLS data and at the 1 percent level for the 2014 IFLS data. The magnitude of these impacts is quite high, at 8 percentage points in 2007 and 16 percentage points in 2014 for one standard deviation increase in religiosity. The estimated impact of religious practice on non-liquid asset variable is also consistent with negative impact by 7 percentage points in 2007 and

10 percentage points in 2014.

Similar to the OLS estimation results, self-assessed religiosity has unexpected positive impact on the *arisan* groups variable for the estimation using the 2014 data. One possible reason for the positive relationship between religiosity and *arisan* participation is that a religious person may be involved in many religious activities, including a religious-based *arisan*. Unfortunately, the data do not distinguish between the religious-based and other types of *arisan*s. Thus, *arisan* variables may not be a good indicator of female autonomy for these estimations.

The estimation in Table 4.12 show contradictory impacts of religiosity on current use of birth control. In 2007, religious practice variable has negative impact on current use of birth control variable at the 5 percent level. However, in 2014, religiosity variable (self-assessed) has positive impacts on current use of birth control, also at the 5 percent level. One possible explanation for the 2014 result is that the distribution of birth control maybe include intensive involvement of religious leaders in that year. Indonesia has had history of religious leaders taking an important role in the success of the national family planning program (Warwick, 1986). However, given that religious practice variable is a more objective measure of religiosity, the positive impact of religiosity using self-assessed measure is maybe due to the highly subjective nature of this variable.

Aside from the religiosity variables, the estimations also include control variables. These results are shown in Appendix Table B1 and B20. Among the control variables, a higher educated wife, compared to her husband, has generally positive impacts on the wife's decision-making power, in particular on child-related decisions. Older women seem to consistently enjoy greater power over many household decisions (for example in Appendix Table B9, women's age positively influence aggregated autonomy measure, child related decisions, routine household decisions, non-routine household decisions and time-use decisions). However, women who are older than their husbands seem to have less decision-making power. A husband's employment status appears to reduce women's decision-making power. The results also show that living with parents-in-law negatively affects women's decision-making power, while the number of children influences the decision-making power positively. Among the kinship norm variables, as expected, patrilocal kinship norms consistently have a negative impact on most decision-making power variables. Also, women who live in Java generally enjoy greater autonomy, which is expected because of the tendency for social and economic infrastructure to be concentrated in Java due to the capital being located there.

Because almost 90 percent of the sample (and of the population of Indonesia) are Muslims, similar estimations were also conducted using only the Muslim population. Tables 4.13, 4.14 and 4.15 provide the estimation results on decision-making power using only the Muslim population.[6]

Compared to the results using all observations in Table 4.7, the OLS estimation results using the Muslim only population in Table 4.13 are very similar, especially for the religious practice variable in 2007 and self-assessed religiosity variable in 2014. For example, the OLS estimation results in 4.13 indicate that self-assessed religiosity negatively influenced aggregate measure of fertility decisions at the 1 percent statistical significance level in 2014 in both estimations using the full sample and using Muslims sample only. There are however several

[6]The complete results for Muslims only and robustness check will not be presented here. They are available on request from the author.

differences between results in Table 4.7 and 4.13. For example in 2007, self-assessed religiosity has no statistical significant impact on fertility decisions in Table 4.7, but it has negative marginal impact (at the 1 percent level) in Table 4.13. Nevertheless, given the likelihood of endogeneity, these results may be biased and hence the fixed-effect and IV estimation results are more likely to be reliable.

The significant OLS estimation results in Table 4.13 do not extend to the fixed-effect estimation results in Table 4.14. Similar to results in Table 4.8, almost none of the estimates using panel data statistically significant, the only exception being the estimation of religious practice on time-use decisions, which is significant only at the 10 percent level. Thus, again, because only one out 12 estimates is statistically significant, this may simply reflect random chance and should not be interpreted as a causal effect.

The IV estimates for the Muslim-only population are shown in Table 4.15. The results again show that all F-statistics are greater than 10. Regarding the validity of the exclusion resstrictions, for the 2007 IFLS, 9 out of 12 estimates in Table 4.15 pass the overidentification tests, which is identical to the results in Table 4.9. Furthermore, using the 2014 IFLS, all the estimates passed the overidentification test in addition to having first-stage F-statistics that are much larger than 10.

The IV results using the 2007 IFLS data in Table 4.15 provide evidence of negative impact of religiosity (religious practice) on the decision-making variables. The only two estimates that are statistically significant are estimated impacts on the aggregate measure of female autonomy (at only the 10 percent level) and on the non-routine household decisions variable (at the 5 percent level). Thus, the estimated impacts using the 2007 data show some negative impacts of religiosity on decision-making power variables.

In contrast, similar to those in Table 4.9, the results using the 2014 IFLS in Table 4.15 show a stronger impact compared to the estimates using the 2007 IFLS. The results using the 2014 IFLS show negative impacts of both measures of religiosity (self-assessment and religious practice) on child-related decisions, routine household decisions, fertility decisions and aggregate measure of female autonomy. Except for the estimates on fertility decisions (statistically significant at the 5 percent level), all estimates are statistically significant at the 1 percent level. The results show that a one standard deviation increase in religious practice reduces the aggregate measure of female autonomy by 1.4 points, while a one unit increase in self-assessed religiosity reduces the same variable by 1.6 points. Recall that the standard deviation for the aggregate measure variable is 2.8, which indicates that the impacts to be quite significant.

The final set of results use the indirect proxy variables of women's autonomy, again, limiting the sample to Muslim women only. These results are shown in Table 4.16, 4.17 and 4.18. The OLS estimations in Tables 4.16 are quite similar to those in Table 4.13, except that the both measures of religiosity are more likely to be statistically significant in 2007 (but not in 2014). In particular, they suggest that an increase in religious practice increases participation in attendance at *arisan* meetings, and reduces women's shares of all and non-liquid household assets.

Fixed-effect estimations in Table 4.17 show no statistically significant results, as in Table 4.8. Turning to the IV estimation results in Table 4.17, the results are practically identical to those in Table 4.9.

4.4.2 Robustness Check

To assess the credibility of the main results, this section provides three robustness checks. The first check repeats all of the estimations using only women the full sample (note: women's below 50 years old constitute around 80 percent of the sample in 2007 and 79 percent of the sample in 2014).

The estimation results are presented in Appendix Table B23 and B28. The results are almost identical to the main results. Religiosity generally has negative impacts on the aggregate measure of autonomy and routine household decisions in the IV estimations using either the 2007 or the 2014 data. *Arisan*-related variables are also positively correlated with religiosity in the IV estimation results. There are, however, a few differences between the IV estimation using the full sample and using only the sample of women below 50 years of age. For example, using the 2014 IFLS, religious practice has no significant impact on child-related decisions assets using sample of women below 50 years old. However, using the full sample leads to significant negative impacts of around 0.115 points, although only marginally significant at the 1 percent level. The consistent results also apply to the OLS and fixed-effect estimation results. These consistent results to the main estimations also hold when the estimations are conducted on Muslims only population (see Appendix Table B30 and B34).

The second robustness check repeats the estimations using the weighted measures of female decision-making power. The estimation measures of decision-making power up to this point use no weights in the construction of the the variables using the 18 questions in the IFLS. Thus, it is implicitly assumed that only wives and husbands have decision-making power in the household. Because the data provide details on other household members who have decision-making power on various decision spheres, this can be used to create a weight for the decision-making power variables. To illustrate the construction of this variable, consider the decision-making power on food (Question 1 of the 18 questions). If *only* the wife has decision making power on food, and no other family members have this power, then value of 1 will be assigned to the wife, and vice versa. However, if two people in the household have decision-making power over food, one of which is the wife, then the value assigned to the wives will be 0.5. If the decision on food is decided by 5 members of the household, including the wife, a value of 0.2 will be assigned to the wife. The same is done for the rest of the decision-making spheres (e.g. child cloth, expensive purchase and fertility decisions). A similar method is also applied to the women's husbands. The final measure is then created by taking the difference between the sum of decisions for which the wives have power on minus those that husbands have power on. The key difference is that now weight is put on how dominant her voice within the household, account is be taken of household members other than the women's spouses.

The results are presented in Appendix Table B35 and B40. The results are again quite consistent with the main estimation results, if not almost identical, whether for OLS, fixed-effect or IV estimations, and whether using either the 2007 or 2009 IFLS data. The IV estimation results again show a negative impact of religiosity (for both measures of religiosity) on female autonomy. For example in 2007, religious practice impacted the aggregate measure negatively by 0.863 points in the IV main results. The results for the same year using the weighted measures show a similar negative impact of religious practice on the aggregate measure by 0.834 points. Furthermore, both are statistically significant at the same 5 percent level.

Lastly, consider estimates that use each of the candidate IVs separately (recall there were 9 candidates of IV: co-religion education, non-coreligion education, community-level self-assessed religiosity, community level religious practice, routine religious activities in the village, more than 75 percent village population participate in religious activities, religious leaders can resolve land conflicts, religious leaders can solve community conflicts, and share of own religion in the village). The results using the IV's that have F-statistics around 8 and above, show almost identical results to the main estimation results. Appendix Table B41 and B44 presents the estimates using community-level religious practice as the instrument.[7] Similar to the main estimation results, the IV estimates also show generally negative impacts on the aggregate measure and on routine household decisions using either the 2007 and 2014 data. The IV estimates also show generally negative impacts of religiosity on wives' shares of non-liquid assets.

4.5 Conclusion

The goal of this study is to estimate the causal impact of religiosity on married women's autonomy within their households. It is challenging to establish causality due to the difficulties in separating the effect of religious adherence from the effects of unobserved factors which might influence both religious adherence and female autonomy. This study tries to overcome this challenge in two ways by: 1.

[7]The first stage estimates have F-statistics around 8 or higher for four IVs: non-coreligion education, more than 75 percent of village population participated in religious activities, community-level self-assessed religiosity, and community-level religious practice. Only the results using the community-level religious practice is presented. The results using the other IVs show very similar results and hence are not presented, but can be requested from the author.

Using panel data to incorporate individual fixed-effects in the estimates; and 2. Using three different instrumental variables in the estimation, which are community religiosity measured by self-assessments, community religiosity measured by religious practice, and whether more than 75 percent of the village population participated in community religious activities. For comparison, the study also presents OLS estimates.

The measures of religiosity are constructed using questions on individuals' perceptions of their own religiosity and individuals' self-reported religious practice (standardized to be comparable across religion). The first measure is a subjective measure, while the second measure is a self-report of a relatively objective measure. Because around 90 percent of the sample (and the population of Indonesia) are Muslims, estimations were also conducted using Muslims only.

The measures of married women's women autonomy are constructed using 18 questions on decision-making power within household, which are used to create five measures of female autonomy, all of which measure the decision-making power of the wife relative to that of her husband. However, because most of these women were interviewed in the presence of other family members, there is a potential problem of inaccuracy in these measures of female autonomy. Thus, additional measures were used to measure female autonomy indirectly: current use of birth control, number of *arisan* groups joined, number of *arisan* meetings attended in the past year, wife's share of *all* household assets, wife's share of all *non-liquid* household assets, and wife's current employment status.

Among the three estimation methods (OLS, fixed-effect, and IV), the IV estimates show some evidence of religiosity effects on female autonomy. However, the fixed-effect estimates show almost no significant impacts of religiosity on women's autonomy. Although the OLS estimates also provide some evidence of negative impact of religiosity on female autonomy, these results are likely bias due to endogeneity.

One possible reason to favor the IV estimates over the fixed-effect estimates is that measurement errors may lead the fixed-effect estimates to be biased towards zero (Deaton, 1997). Given the religiosity measures are likely to be measured with error, this might have led to the lack of statistical significant results from the fixed-effect estimations. The IV method not only resolves problems of endogeneity, but also removes bias due to measurement errors. This may be the reason for more statistically significant results in the IV estimates. However, the results for the IV method are influenced by the quality of the IVs used. Thus the IV estimates may also be biased. In particular, there is a risk of not satisfying the exclusion restriction required for the instruments. However, given that most of the IV estimates show almost identical results across different specifications (including using only one IV), at the very least we can probably conclude that there may be some significant correlation between religiosity and female autonomy.

Considering the strength and weaknesses of both the fixed-effect and IV estimates, this study can only conclude that if there is an impact of religiosity on female autonomy, the impact is likely to be negative. However, this study cannot rule out with 100 percent certainty the possibility that religiosity may have negligible impacts on female autonomy. Thus, the results provide only weak evidence that religiosity reduces female autonomy. With the current global increase in extreme interpretation of religious tenets, increased religiosity may lead to reduced female autonomy. As female autonomy is closely related to child development, the issue will remain relevant for human capital development research.

If these results are correct that increased religiosity reduces female autonomy, the results on the control variables, while not estimated as carefully as the results for religiosity, may provide useful policy advice. For example, they suggest that education may be one of the most important factor to increase the women's status. This is consistent with some studies on female autonomy connecting education and female autonomy (Beegle et al., 2001; Jeffery and Basu, 1996; Jejeebhoy et al., 1995). Thus, an increase in women's education could increase female autonomy that lead to improvements in child development.

Besides education, local kinship norms seem to also hold an important key to women's status. This may indicate that there is a need for community-level work to slowly dismantle structural patriarchy that exists in many communities. Indonesia can learn from its own history of the success of its family planning program during 1980s (Warwick, 1986). In order to break the resistance of family planning through birth control, the government conducted an intensive outreach for many years to various religious leaders across different religions. The religious leaders, thus, played pivotal roles in making this program a success. The government and civil society in Indonesia can learn from this program on how to change the cultural or religious perceptions that reduces female autonomy through social outreach and education.

In closing, the above interpretation of the results should be treated with caution because the measures of religiosity and female autonomy available from the IFLS have some limitations. Two examples are that the data combine both spouse's work when asking about the wife's decision-making power on work-related decisions, and most of the women were interviewed in the presence of other household members. Furthermore, although this study has provided evidence that the impacts of religiosity on female autonomy may be negative, this evidence is not definitive. Thus, the results of this study should be interpreted as providing a tentative support for the hypothesis that increased religiosity has the negative impacts on female autonomy. Future research using more precise data on religiosity and better methodology may provide a more conclusive test to the veracity of this study's results.

Tables

Table 4.1: *Distribution of Women's Decision-making Power in Households (Full Sample)*

	IFLS 2007				IFLS 2014			
Decision making spheres	Sole decider	Jointly with husband	Jointly with other than husband	Obs	Sole decider	Jointly with husband	Jointly with other than husband	Obs
Children related decisions:								
Children's clothes (=1)	28.7%	62.4%	4.4%	9418	62.1%	25.6%	7.9%	11029
Children's education (=1)	10.1%	83.9%	1.9%	9355	27.3%	62.1%	2.0%	11019
Children's health (=1)	11.0%	84.8%	1.3%	9393	29.9%	63.3%	1.6%	11034
Routine household decisions:								
Expenditure on food at home (=1)	64.0%	24.1%	6.7%	10027	69.3%	19.4%	4.6%	11819
Choice of food at home (=1)	69.1%	19.4%	7.4%	10027	75.8%	14.2%	5.5%	11819
Routine household purchases (=1)	64.8%	26.1%	5.8%	10027	77.3%	13.6%	4.3%	11819
Own clothes (=1)	52.4%	45.3%	0.8%	10027	81.0%	15.1%	1.0%	11819
Spouse's clothes (=1)	29.3%	57.0%	0.7%	10026	51.6%	25.6%	1.2%	11819
Non-routine household decisions:								
Large expenses (=1)	7.3%	82.6%	2.6%	10022	20.5%	64.3%	5.0%	11819
Money transfers to own parents (=1)	8.0%	89.7%	0.3%	9673	24.7%	66.8%	0.4%	11489
Money transfers to parents in laws (=1)	5.5%	91.2%	0.2%	9628	18.9%	69.0%	0.3%	11422
Gifts for wedding or parties (=1)	12.4%	85.2%	0.5%	10026	31.4%	61.9%	0.7%	11819
Money for *arisan* (=1)	32.2%	62.2%	1.9%	6116	51.5%	39.1%	1.4%	9102
Money for saving (=1)	20.7%	70.9%	1.5%	5993	43.1%	43.5%	1.2%	9049
Time use decisions:								
Husband's time for socializing (=1)	9.9%	66.0%	0.1%	10025	14.8%	42.9%	0.1%	11819
Wife's time for socializing (=1)	36.8%	60.9%	0.1%	10026	52.8%	41.9%	0.2%	11819
Own or spouse's work (=1)	6.5%	80.5%	0.4%	10017	10.6%	63.7%	0.2%	11819
Fertility decision								
Birth control use (=1)	23.6%	74.8%	0.0%	7885	40.5%	54.3%	0.0%	10492

Table 4.2: *Distribution of Women's Decision-making Power in Households (Panel Sample)*

	IFLS 2007				IFLS 2014			
Decision making spheres	Sole decider	Jointly with husband	Jointly with other than husband	Obs	Sole decider	Jointly with husband	Jointly with other than husband	Obs
Children related decisions:								
Children's clothes (=1)	29.2%	63.4%	3.4%	7629	62.3%	22.5%	10.3%	7720
Children's education (=1)	9.8%	85.2%	1.5%	7577	28.8%	59.7%	2.4%	7717
Children's health (=1)	10.6%	86.1%	0.9%	7609	31.8%	60.8%	1.9%	7725
Routine household decisions:								
Expenditure on food at home (=1)	64.5%	24.5%	6.0%	8091	73.4%	18.8%	2.3%	7910
Choice of food at home (=1)	69.7%	19.6%	6.7%	8091	80.0%	12.7%	3.2%	7910
Routine household purchases (=1)	65.4%	26.6%	5.1%	8091	81.1%	12.6%	2.6%	7910
Own clothes (=1)	52.6%	45.8%	0.4%	8091	83.0%	13.1%	1.4%	7910
Spouse's clothes (=1)	29.1%	58.1%	0.3%	8091	52.6%	23.8%	1.7%	7910
Non-routine household decisions:								
Large expenses (=1)	6.8%	84.0%	2.1%	8086	22.2%	63.8%	3.9%	7910
Money transfers to own parents (=1)	7.5%	90.4%	0.2%	7881	26.4%	65.8%	0.5%	7639
Money transfers to parents in laws (=1)	5.3%	91.7%	0.1%	7845	20.6%	68.0%	0.4%	7588
Gifts for wedding or parties (=1)	11.6%	86.5%	0.2%	8090	33.4%	60.8%	0.7%	7910
Money for *arisan* (=1)	31.3%	63.6%	1.6%	5026	54.7%	37.2%	1.1%	6175
Money for saving (=1)	20.3%	72.0%	1.3%	4869	45.7%	41.1%	1.4%	5937
Time use decisions:								
Husband's time for socializing (=1)	9.9%	66.8%	0.1%	8090	15.1%	42.3%	0.1%	7910
Wife's time for socializing (=1)	36.4%	61.6%	0.1%	8090	55.3%	40.5%	0.2%	7910
Own or spouse's work (=1)	6.1%	81.0%	0.2%	8084	11.8%	65.1%	0.2%	7910
Fertility decision:								
Birth control use (=1)	23.5%	74.9%	0.0%	6609	42.4%	53%	0.0%	7083

Table 4.3: *Summary Statistics for Wife's & Husband's Assets Shares (%)*

	IFLS 2007				IFLS 2014			
	Wife		Husband		Wife		Husband	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev	Mean	Std. Dev
House	48.01	26.1	50.16	26.7	44.12	38.1	51.59	39.3
Other house	45.19	30.8	53.12	32.1	44.49	41.0	52.18	42.4
Non-farm land	46.71	33.1	52.39	34.9	42.22	41.0	56.21	42.5
Livestock	46.67	29.9	51.50	31.0	41.00	40.3	55.18	41.4
Vehicle	39.34	27.7	57.38	29.1	31.78	35.6	58.79	37.8
Household appliances	46.91	20.7	47.37	21.1	47.27	33.1	41.28	33.2
Savings/certificates of deposit/stocks	52.87	33.6	45.40	34.9	55.98	41.6	40.14	42.6
Receivables	51.13	38.8	48.55	40.4	53.62	44.4	45.37	45.8
Jewelrys	74.41	29.7	18.92	27.5	82.35	29.8	8.03	22.5
Furnitures	50.00	18.5	45.01	18.0	57.36	32.9	33.92	31.5
Panel Sample								
House	47.94	25.8	50.20	26.3	45.28	37.7	50.54	38.7
Other house	45.39	30.3	52.83	31.6	45.27	40.3	52.02	41.8
Non-farm land	45.81	33.1	53.12	34.8	43.02	40.5	55.49	42.0
Livestock	46.11	29.5	52.01	30.5	43.47	40.2	52.70	41.1
Vehicle	39.23	27.5	57.46	28.8	32.54	35.2	58.05	37.1
Household appliances	47.02	20.4	47.42	20.8	48.52	33.0	41.30	32.8
Savings/certificates of deposit/stocks	52.74	33.5	45.54	34.7	56.16	41.9	39.99	43.0
Receivables	49.88	38.5	49.87	40.0	56.43	43.4	42.36	44.8
Jewelrys	74.00	29.6	19.50	27.5	82.37	29.6	8.39	22.9
Furnitures	49.82	18.0	45.30	17.5	59.46	32.5	33.44	30.9

Table 4.4: *Summary Statistics for Indirect Proxy of Women's Autonomy*

	Mean (sd)	Observation
IFLS 2007		
Use birth control (=1)	56.9%	8714
Number of saving lottery *groups* participated last year	0.557(0.86)	10506
Number of saving lottery *meetings* attended last year	8.025(16.74)	10500
Employed (=1)	58.4%	10515
IFLS 2014		
Use birth control (=1)	57.3%	10255
Number of saving lottery *groups* participated last year	1.612(1.0)	6126
Number of saving lottery *meetings* attended last year	N/A	N/A
Employed (=1)	61.9%	12685
Panel Sample		
IFLS 2007		
Use birth control (=1)	58.6%	8714
Number of saving lottery *groups* participated last year	0.576(0.87)	10506
Number of saving lottery *meetings* attended last year	8.374(17.12)	10500
Employed (=1)	59.2%	10515
IFLS 2014		
Use birth control (=1)	60.4%	10255
Number of saving lottery *groups* participated last year	1.661(1.03)	6126
Number of saving lottery *meetings* attended last year	N/A	N/A
Employed (=1)	66.1%	12685

Table 4.5: *Summary Statistics of Religiosity*

	IFLS 2007			IFLS 2014		
	Mean	Std. dev	Obs	Mean	Std. dev	Obs
Religiosity (self-assessment)	0.110	0.90	10495	0.091	0.94	12220
by religion:						
Islam	0.080	0.91	9454	0.055	0.94	11076
Christian	0.213	0.85	381	0.188	0.89	429
Catholic	0.213	0.85	172	0.140	0.84	140
Hindu	0.581	0.75	488	0.694	0.81	575
Religiosity (religious practice)	0.047	0.81	9946	0.075	0.87	11712
by religion:						
Islam	0.027	0.80	8904	0.065	0.86	10569
Christian	0.236	0.88	381	0.157	0.91	429
Catholic	0.168	0.82	172	0.249	0.84	140
Hindu	0.221	0.91	489	0.158	0.98	574

All religiosity variables are standardized

Table 4.6: *Summary Statistics for Instrumental & Control Variables*

	FULL SAMPLE				**PANEL SAMPLE**			
	IFLS 2007		IFLS 2014		IFLS 2007		IFLS 2014	
	Mean (sd)	Obs	Mean (sd)	Obs	Mean (sd)	Obs	Mean (sd)	Obs
Instrumental variables:								
Community religiosity (assessment)	2.957 (0.23)	10244	3.087 (0.30)	12610	2.957 (0.23)	7839	3.087 (0.29)	8214
Community religiosity (behaviors)	2.794 (0.26)	10247	2.815 (0.25)	12612	2.793 (0.26)	7840	2.814 (0.25)	8217
Community religiosity (praying frequency - only Muslims)	5.296 (0.91)	9487	5.610 (1.10)	11750	5.293 (0.89)	7239	5.604 (1.08)	7657
More than 75 percent of village population participated in religious activities (=1)	53.3%	7784	50.7%	8751	53.5%	6082	51.3%	6024
Control Variables								
Wife's age	37.787 (13.12)	12339	38.631 (12.69)	14853	36.083 (11.66)	9356	42.933 (11.64)	9362
Wife's years of education	8.182 (4.22)	9673	8.860 (4.29)	12094	8.220 (4.17)	7957	8.176 (4.29)	7879
Religion is Islam (=1)	89.8%	12355	90.1%	14860	90.1%	9362	90.1%	9361
Husband's age	42.988 (14.22)	11224	43.519 (13.70)	13301	40.980 (12.56)	8623	47.923 (12.62)	8577
Husband's years of education	8.123 (4.42)	10670	8.923 (4.37)	11815	8.199 (4.34)	8607	8.346 (4.48)	7484
Husband is employed (=1)	93.3%	9308	93.6%	11369	95.6%	7604	92.0%	7646
Household size	6.130 (3.06)	12356	6.352 (3.25)	14862	5.96 (2.96)	9362	6.485 (3.05)	9362
Number of children in household	1.437 (1.15)	12356	1.417 (1.09)	14862	1.489 (1.14)	9362	1.458 (1.10)	9362
Log percapita expenditure	12.934 (0.68)	11569	13.638 (0.63)	13096	12.917 (0.66)	9048	13.646 (0.63)	8312
Live with wife's parents (=1)	13.6%	10488	14%	12601	13.8%	8496	9.0%	8366
Live with husband's parents (=1)	8.7%	9284	8.6%	11260	9.1%	7587	5.1%	7583
Live with neither parents (=1)	76.3%	9437	76.4%	11520	75.9%	7733	85.1%	7604
Urban (=1)	52.3%	12356	57.6%	14862	49.6%	9362	57.2%	9362
Java (=1)	57.6%	12355	55.2%	14846	56.5%	9362	56.5%	9357
Uxorilocal kinship norms (=1)	53.3%	7994	52.9%	10297	52.8%	6250	52.9%	6340
Patrilocal kinship norms (=1)	22.3%	7994	22.9%	10297	22.4%	6250	22.4%	6340
Ambilocal kinship norms (=1)	24.4%	7994	24.2%	10297	24.8%	6250	24.7%	6340

Table 4.7: *OLS Estimation of the Impact of Religiosity on Women's Decision-making Power*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
IFLS 2007						
Religiosity (self-assessment)	-0.023	0.005	-0.014	-0.004	-0.017*	0.011
	(0.050)	(0.012)	(0.032)	(0.016)	(0.010)	(0.006)
Observations	4417	4141	4417	4417	4417	3788
Adjusted R^2	0.029	0.009	0.022	0.016	0.026	0.009
Religiosity (religious practice)	-0.064	-0.009	0.012	-0.053***	-0.024**	0.011
	(0.055)	(0.013)	(0.041)	(0.017)	(0.011)	(0.009)
Observations	4170	3919	4170	4170	4170	3582
Adjusted R^2	0.027	0.008	0.021	0.017	0.028	0.009
IFLS 2014						
Religiosity (self-assessment)	-0.192***	-0.049***	-0.099***	-0.041*	0.002	-0.007
	(0.059)	(0.017)	(0.028)	(0.024)	(0.013)	(0.008)
Observations	5239	4881	5239	5239	5239	4872
Adjusted R^2	0.052	0.028	0.040	0.028	0.027	0.011
Religiosity (religious practice)	-0.095	-0.043**	-0.038	0.027	-0.023*	-0.024**
	(0.069)	(0.019)	(0.035)	(0.027)	(0.013)	(0.009)
Observations	4996	4659	4996	4996	4996	4646
Adjusted R^2	0.052	0.028	0.037	0.028	0.030	0.013

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Control variables: wife's age, wife's age^2, wife's years of education, religion is Islam, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table 4.8: *Fixed-effect Estimation of the Impact of Religiosity on Women's Decision-making Power*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
Religiosity	-0.049	-0.014	-0.019	-0.005	-0.013	0.003
(self-assessment)	(0.057)	(0.017)	(0.032)	(0.023)	(0.013)	(0.009)
Observations	10417	9970	10417	10417	10417	9409
Adjusted R^2	0.134	0.158	0.118	0.045	0.039	0.024
F-stat	33.783	37.138	26.853	12.669	8.673	5.600
Religiosity	-0.009	0.021	-0.002	0.018	-0.030*	-0.011
(religious practice)	(0.070)	(0.020)	(0.043)	(0.028)	(0.016)	(0.012)
Observations	9947	9529	9947	9947	9947	8993
Adjusted R^2	0.136	0.156	0.121	0.045	0.039	0.023
F-stat	32.925	33.260	26.843	11.198	9.088	4.762

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Control variables: wife's age, wife's age^2, wife's years of education, religion is Islam, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, urban, and Java

Table 4.9: *IV Estimation of the Impact of Religiosity on Women's Decision-making Power*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
IFLS 2007						
Religiosity (self-assessment)	-0.205	-0.046	-0.050	-0.056	-0.066	0.028
	(0.381)	(0.102)	(0.268)	(0.105)	(0.075)	(0.066)
Observations	4284	4018	4284	4284	4284	3673
Adjusted R^2	0.025	0.002	0.023	0.011	0.019	0.008
First stage F-stat	16.65	13.19	16.65	16.65	16.65	13.45
$\tilde{\chi}^2$ *P-val* *(Overidentification test)*	0.024	0.468	0.025	0.039	0.781	0.569
Religiosity (religious practice)	-0.863**	-0.107	-0.441*	-0.257***	-0.013	-0.045
	(0.356)	(0.089)	(0.227)	(0.090)	(0.054)	(0.050)
Observations	4046	3805	4046	4046	4046	3474
Adjusted R^2	-0.030	-0.007	-0.016	-0.020	0.029	-0.004
First stage F-stat	17.25	16.71	17.25	17.25	17.25	18.54
$\tilde{\chi}^2$ *P-val* *(Overidentification test)*	0.103	0.755	0.114	0.178	0.589	0.466
IFLS 2014						
Religiosity (self-assessment)	-1.821***	-0.488***	-1.030***	-0.151	-0.115	-0.095*
	(0.513)	(0.134)	(0.279)	(0.161)	(0.088)	(0.051)
Observations	4042	3811	4042	4042	4042	3781
Adjusted R^2	-0.115	-0.134	-0.176	0.021	0.006	-0.020
First stage F-stat	19.79	18.73	19.79	19.79	19.79	20.05
$\tilde{\chi}^2$ *P-val* *(Overidentification test)*	0.579	0.447	0.987	0.463	0.580	0.070
Religiosity (religious practice)	-1.315***	-0.346***	-0.665***	-0.200	-0.056	-0.087**
	(0.377)	(0.100)	(0.200)	(0.125)	(0.065)	(0.043)
Observations	3874	3660	3874	3874	3874	3623
Adjusted R^2	-0.018	-0.031	-0.031	0.012	0.026	0.001
First stage F-stat	22.86	23.76	22.86	22.86	22.86	21.96
$\tilde{\chi}^2$ *P-val* *(Overidentification test)*	0.131	0.109	0.016	0.639	0.357	0.882

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variables are: community-level self-assessed religiosity, community-level religious practice, and more than 75 percent village population participation in religious practice.
Control variables: wife's age, wife's age^2, wife's years of education, religion is Islam, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table 4.10: *OLS Estimation of the Impact of Religiosity on Indirect Proxy of Women's Autonomy*

	Currently use birth control	Number of *arisan* groups joined	Number of *arisan* *meetings* attended last year	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
IFLS 2007						
Religiosity (self-assessment)	0.010	0.023	0.830***	-0.498*	-1.094*	0.010
	(0.008)	(0.015)	(0.301)	(0.281)	(0.590)	(0.009)
Observations	4413	4418	4418	4367	3039	4418
Adjusted R^2	0.061	0.147	0.078	0.033	0.054	0.082
Religiosity (praying behavior)	-0.001	0.023	0.494	-0.401	0.790	-0.006
	(0.010)	(0.020)	(0.351)	(0.304)	(0.600)	(0.012)
Observations	4166	4171	4171	4127	2910	4171
Adjusted R^2	0.060	0.149	0.077	0.036	0.056	0.081
IFLS 2014						
Religiosity (self-assessment)	0.003	-0.014	N/A	-0.263	-0.970	0.013*
	(0.007)	(0.019)		(0.346)	(0.704)	(0.008)
Observations	5233	2697		5216	3572	5239
Adjusted R^2	0.080	0.059		0.057	0.075	0.081
Religiosity (praying behavior)	-0.011	0.021	N/A	-0.136	0.605	0.005
	(0.009)	(0.028)		(0.368)	(0.734)	(0.012)
Observations	4990	2597		4975	3452	4996
Adjusted R^2	0.081	0.057		0.058	0.076	0.074

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Control variables: wife's age, wife's age^2, wife's years of education, religion is Islam, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table 4.11: *Fixed-effect Estimation of the Impact of Religiosity on Indirect Proxy of Women's Autonomy*

	Currently use birth control	Number of *arisan* groups joined	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
Religiosity (self-assessment)	-0.015*	0.033	0.424	0.080	-0.001
	(0.008)	(0.022)	(0.360)	(0.721)	(0.008)
Observations	10407	8445	10361	7531	10418
Adjusted R^2	0.068	0.362	0.011	0.013	0.072
F-stat	18.818	74.548	3.165	2.263	18.253
Religiosity (religious practice)	-0.016	0.006	-0.857*	1.057	0.001
	(0.010)	(0.030)	(0.478)	(0.854)	(0.011)
Observations	9937	8053	9897	7271	9948
Adjusted R^2	0.070	0.360	0.014	0.016	0.073
F-stat	18.875	69.564	3.399	2.467	16.568

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Control variables: wife's age, wife's age^2, wife's years of education, religion is Islam, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, urban, and Java

Table 4.12: *IV Estimation of the Impact of Religiosity on Indirect Proxy of Women's Autonomy*

	Currently use birth control	Number of *arisan* groups joined	Number of *arisan meetings* attended last year	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
IFLS 2007						
Religiosity (self-assessment)	-0.041	0.240	4.804	-1.387	-8.800**	0.122*
	(0.061)	(0.157)	(3.370)	(1.799)	(3.557)	(0.072)
Observations	4281	4285	4285	4237	2949	4285
Adjusted R^2	0.053	0.100	0.041	0.030	-0.012	0.040
First stage F-stat	16.67	16.67	16.67	16.93	10.30	16.67
$\tilde{\chi}^2$ *P-val* *(Overidentification test)*	0.013	0.946	0.637	0.762	0.581	0.064
Religiosity (religious practice)	-0.131**	0.131	0.890	-1.682	-7.570**	0.087
	(0.052)	(0.130)	(2.462)	(1.637)	(3.394)	(0.061)
Observations	4043	4047	4047	4006	2822	4047
Adjusted R^2	0.022	0.143	0.077	0.033	-0.003	0.061
First stage F-stat	17.16	17.23	17.23	17.69	18.36	17.23
$\tilde{\chi}^2$ *P-val* *(Overidentification test)*	0.215	0.754	0.369	0.989	0.651	0.038
IFLS 2014						
Religiosity (self-assessment)	0.119**	0.366**	N/A	-9.004***	-16.446***	0.054
	(0.051)	(0.172)		(2.870)	(4.738)	(0.075)
Observations	4038	2128		4027	2879	4042
Adjusted R^2	0.019	-0.049		-0.083	-0.082	0.065
First stage F-stat	19.87	15.82		20.53	18.53	19.79
$\tilde{\chi}^2$ *P-val* *(Overidentification test)*	0.104	0.107		0.189	0.800	0.412
Religiosity (religious practice)	0.055	-0.031	N/A	-6.566***	-10.218***	0.017
	(0.039)	(0.129)		(2.256)	(3.805)	(0.063)
Observations	3870	2056		3861	2794	3874
Adjusted R^2	0.059	0.064		0.005	0.019	0.063
First stage F-stat	22.91	14.86		22.84	18.57	22.86
$\tilde{\chi}^2$ *P-val* *(Overidentification test)*	0.028	0.040		0.104	0.167	0.378

Standard errors, clustered at community level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variables are: community-level self-assessed religiosity, community-level religious practice, and more than 75 percent village population participation in religious practice.
Control variables: wife's age, wife's age^2, wife's years of education, religion is Islam, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table 4.13: *OLS Estimation of the Impact of Religiosity on Women's Decision-making Power (only for Muslims)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
IFLS 2007						
Religiosity (self-assessment)	-0.015	0.008	-0.007	-0.002	-0.022**	0.011*
	(0.053)	(0.013)	(0.033)	(0.017)	(0.010)	(0.007)
Observations	4005	3746	4005	4005	4005	3441
Adjusted R^2	0.028	0.006	0.017	0.015	0.025	0.008
Religiosity (religious practice)	-0.034	-0.008	0.035	-0.046***	-0.027**	0.015
	(0.055)	(0.013)	(0.043)	(0.018)	(0.013)	(0.010)
Observations	3752	3518	3752	3752	3752	3229
Adjusted R^2	0.025	0.005	0.015	0.015	0.027	0.008
IFLS 2014						
Religiosity (self-assessment)	-0.171***	-0.049***	-0.086***	-0.033	0.004	-0.009
	(0.061)	(0.018)	(0.029)	(0.025)	(0.014)	(0.008)
Observations	4755	4429	4755	4755	4755	4452
Adjusted R^2	0.050	0.028	0.035	0.028	0.025	0.011
Religiosity (religious practice)	-0.161**	-0.063***	-0.065*	0.019	-0.028*	-0.029***
	(0.075)	(0.021)	(0.037)	(0.030)	(0.015)	(0.010)
Observations	4510	4205	4510	4510	4510	4224
Adjusted R^2	0.051	0.029	0.033	0.028	0.028	0.013

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Control variables: wife's age, wife's age^2, wife's years of education, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table 4.14: *Fixed-effect Estimation of the Impact of Religiosity on Women's Decision-making Power (only for Muslims)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
Religiosity (self-assessment)	-0.025	-0.011	-0.015	0.010	-0.011	0.001
	(0.059)	(0.017)	(0.033)	(0.024)	(0.014)	(0.009)
Observations	9467	9055	9467	9467	9467	8592
Adjusted R^2	0.136	0.171	0.117	0.048	0.038	0.024
F-stat	34.235	40.301	26.169	13.443	8.626	5.460
Religiosity (religious practice)	-0.026	0.014	-0.003	0.013	-0.033*	-0.012
	(0.076)	(0.022)	(0.046)	(0.031)	(0.018)	(0.013)
Observations	8990	8607	8990	8990	8990	8169
Adjusted R^2	0.139	0.171	0.121	0.047	0.039	0.023
F-stat	33.888	37.651	25.391	11.622	8.895	4.663

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Control variables: wife's age, wife's age^2, wife's years of education, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, urban, and Java

Table 4.15: *IV Estimation of the Impact of Religiosity on Women's Decision-making Power (only for Muslims)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
IFLS 2007						
Religiosity (self-assessment)	-0.190	-0.039	-0.075	-0.050	-0.041	0.036
	(0.391)	(0.109)	(0.280)	(0.105)	(0.079)	(0.068)
Observations	3889	3640	3889	3889	3889	3338
Adjusted R^2	0.024	0.000	0.017	0.012	0.025	0.005
First stage F-stat	16.17	12.58	16.17	16.17	16.17	13.60
$\tilde{\chi}^2$ *P-val (Overidentification test)*	0.022	0.293	0.055	0.019	0.743	0.141
Religiosity (religious practice)	-0.617*	-0.066	-0.343	-0.189**	0.028	-0.039
	(0.342)	(0.089)	(0.241)	(0.086)	(0.060)	(0.050)
Observations	3646	3422	3646	3646	3646	3134
Adjusted R^2	-0.004	-0.001	-0.009	-0.002	0.022	-0.004
First stage F-stat	15.08	14.73	15.08	15.08	15.08	16.58
$\tilde{\chi}^2$ *P-val (Overidentification test)*	0.211	0.639	0.197	0.227	0.453	0.211
IFLS 2014						
Religiosity (self-assessment)	-1.621***	-0.466***	-0.894***	-0.110	-0.068	-0.123**
	(0.502)	(0.136)	(0.273)	(0.157)	(0.085)	(0.051)
Observations	3655	3445	3655	3655	3655	3443
Adjusted R^2	-0.087	-0.121	-0.135	0.021	0.016	-0.042
First stage F-stat	19.47	18.38	19.47	19.47	19.47	19.87
$\tilde{\chi}^2$ *P-val (Overidentification test)*	0.508	0.442	0.919	0.418	0.587	0.386
Religiosity (religious practice)	-1.367***	-0.366***	-0.693***	-0.183	-0.055	-0.094**
	(0.399)	(0.106)	(0.208)	(0.133)	(0.072)	(0.046)
Observations	3486	3293	3486	3486	3486	3284
Adjusted R^2	-0.018	-0.031	-0.039	0.013	0.025	-0.000
First stage F-stat	23.00	23.55	23.00	23.00	23.00	22.05
$\tilde{\chi}^2$ *P-val (Overidentification test)*	0.585	0.429	0.182	0.680	0.704	0.891

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variables are: community-level self-assessed religiosity, community-level religious practice, and more than 75 percent village population participation in religious practice.
Control variables: wife's age, wife's age^2, wife's years of education, religion is Islam, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table 4.16: *OLS Estimation of the Impact of Religiosity on Indirect Proxy of Women's Autonomy (only for Muslims)*

	Currently use birth control	Number of *arisan* groups joined	Number of *arisan meetings* attended last year	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
IFLS 2007						
Religiosity (self-assessment)	0.008	0.027*	0.944***	-0.319	-0.940	0.010
	(0.008)	(0.015)	(0.318)	(0.272)	(0.627)	(0.009)
Observations	4004	4006	4006	3959	2774	4006
Adjusted R^2	0.065	0.142	0.072	0.033	0.045	0.072
Religiosity (religious practice)	-0.006	0.026	0.552	-0.079	1.454**	-0.006
	(0.010)	(0.022)	(0.407)	(0.318)	(0.646)	(0.012)
Observations	3751	3753	3753	3714	2642	3753
Adjusted R^2	0.065	0.143	0.070	0.037	0.050	0.070
IFLS 2014						
Religiosity (self-assessment)	0.001	-0.016	N/A	-0.140	-0.589	0.013
	(0.007)	(0.019)		(0.359)	(0.749)	(0.008)
Observations	4749	2504		4736	3248	4755
Adjusted R^2	0.080	0.065		0.053	0.070	0.071
Religiosity (religious practice)	-0.013	0.024	N/A	-0.322	0.407	-0.003
	(0.010)	(0.028)		(0.401)	(0.761)	(0.010)
Observations	4504	2403		4493	3127	4510
Adjusted R^2	0.081	0.062		0.054	0.072	0.064

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Control variables: wife's age, wife's age^2, wife's years of education, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table 4.17: *Fixed-effect Estimation of the Impact of Religiosity on Indirect Proxy of Women's Autonomy (only for Muslims)*

	Currently use birth control	Number of *arisan* groups joined	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
Religiosity (self-assessment)	-0.014	0.022	0.763**	0.531	-0.002
	(0.008)	(0.022)	(0.381)	(0.752)	(0.008)
Observations	9460	7721	9414	6890	9468
Adjusted R^2	0.070	0.367	0.010	0.011	0.075
F-stat	19.234	70.889	2.764	2.047	18.622
Religiosity (religious practice)	-0.010	0.020	-0.877*	0.818	0.004
	(0.011)	(0.026)	(0.515)	(0.924)	(0.012)
Observations	8983	7322	8944	6626	8991
Adjusted R^2	0.072	0.366	0.012	0.013	0.076
F-stat	18.829	64.528	2.778	2.191	16.890

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Control variables: wife's age, wife's age^2, wife's years of education, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, urban, and Java

Table 4.18: *IV Estimation of the Impact of Religiosity on Indirect Proxy of Women's Autonomy (only for Muslims)*

	Currently use birth control	Number of *arisan* groups joined	Number of *arisan meetings* attended last year	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
IFLS 2007						
Religiosity	-0.099	0.259	4.257	-1.724	-9.183**	0.097
(self-assessment)	(0.062)	(0.168)	(3.513)	(1.973)	(3.918)	(0.076)
Observations	3889	3890	3890	3845	2698	3890
Adjusted R^2	0.025	0.090	0.049	0.026	-0.033	0.047
First stage F-stat	16.19	16.19		16.19	16.73	10.38
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.037	0.886	0.564	0.823	0.836	0.154
Religiosity	-0.162***	0.137	0.384	-1.902	-8.492**	0.070
(religious practice)	(0.055)	(0.141)	(2.747)	(1.833)	(3.681)	(0.067)
Observations	3646	3647	3647	3609	2568	3647
Adjusted R^2	0.012	0.139	0.072	0.030	-0.032	0.059
First stage F-stat	14.51	11.34		14.51	9.94	14.51
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.381	0.686	0.347	0.918	0.484	0.116
IFLS 2014						
Religiosity	0.045	0.358**	N/A	-7.673***	-13.978***	0.043
(self-assessment)	(0.047)	(0.162)		(2.817)	(4.662)	(0.075)
Observations	3651	1969		3642	2610	3655
Adjusted R^2	0.065	-0.037		-0.055	-0.052	0.060
First stage F-stat	19.51	16.62		20.09	18.11	19.47
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.680	0.100		0.181	0.651	0.071
Religiosity	0.034	0.102	N/A	-6.802***	-10.991***	0.002
(religious practice)	(0.041)	(0.130)		(2.463)	(4.186)	(0.062)
Observations	3482	1896		3475	2525	3486
Adjusted R^2	0.067	0.068		0.000	0.005	0.054
First stage F-stat	23.04	18.92		23.04	19.60	23.00
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.629	0.023		0.160	0.433	0.070

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variables are: community-level self-assessed religiosity, community-level religious practice, and more than 75 percent village population participation in religious practice.
Control variables: wife's age, wife's age^2, wife's years of education, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table 4.19: *Changes in Religiosity between the 2007 and 2014 IFLS*

	Not religious	Somewhat religious	Religious	Very religious
Not religious	16	54	63	6
Somewhat religious	37	368	592	123
Religious	80	683	4216	1212
Very religious	2	36	239	196

Chapter 5

Conclusion

The first chapter of this essay examines the underlying causes of the poor performance of the Indonesia's CCT program on child health outcomes. A theory of change was constructed to provide a framework that generated seven testable hypotheses to explain that poor performance. The empirical estimates indicate that there is no evidence that compliance with the required behaviors was enforced during the implementation of the CCT program. This appears to have influenced the efficacy of the program to improve child health outcomes. Furthermore, there is a suggestive evidence that the required behaviors may not necessarily have significant positive influences on child health outcomes. The estimates also reject these two hypotheses: that the program might be reinforcing a behavior that was already part of households' behavioral decisions and that the supply of health services in the program areas may not be sufficient. The empirical estimation also highlights the difficulties in examining the underlying mechanism of the program using the data that were designed mostly to estimate the impact of the program. Future RCT-based impact evaluations of a program should consider building a theory of change in order to collect data that can be used to examine the underlying mechanism of the program.

The second essay estimates the impact of macroeconomic shocks on child cognitive outcomes. In particular, the essay examines the impact of the 1997

East Asian Financial Crisis on Indonesia's children's accumulation of cognitive skills. Using sibling-fixed effects, the results show negative impacts of exposure to the crisis on math and aggregate cognitive scores. Exposure to the crisis when the children were still in utero appears to be most damaging for the cognitive skills development. The burden of negative impacts, however, is borne mostly by the children in urban areas. Children in rural areas seem to be protected from the harmful impact of the crisis. However, this appears to apply only for children in rural areas whose households have access to farmland. Those children in rural areas whose families have no access to farmland appear to have been less protected from the impact of the crisis. The results also indicate that during the economic crisis, social safety nets focusing on pregnant mothers may be important to mitigate the deleterious impacts of the crisis due to significant pre-natal effects. Specific policies in urban areas may also be needed as most of the impacts of the crisis fell on children in those areas.

The third and last essay attempts to estimate the causal impacts of religiosity on married women's autonomy within their households using the 2007 and 2014 IFLS data. The empirical estimations use three estimation methods in order to do this: OLS, wife fixed-effect, and instrumental variables (IV). The results from the fixed-effect estimates contradict the results from the IV method. The fixed effect estimates provide no evidence of any impacts (negative or otherwise) on female autonomy variables. The results using the IV method, however, show some negative impacts of religiosity on female autonomy, in particular those estimates show consistent negative impacts on non-routine household decisions. Given the data and methodological limitations, this study can provide only weak evidence of a negative impact of religiosity on female autonomy. In other words, if there is a significant impact of religiosity on female autonomy, it will likely be negative. However, it is also possible that there is no impact of religiosity on female autonomy, shown by the fixed-effect results.

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Appendix A

Table A1: *Balance Check of Household Characteristics*

Variable	Treatment	Control	Difference	Treatment (N)	Control (N)
Household size	5.749 (2.07)	5.753 (1.97)	-0.005 [0.104]	36801	36762
Household head is female (=1)	7.8%	7.5%	0.002 [0.006]	36801	36762
Household head working in agriculture (=1)	68.6%	66.6%	0.020 [0.027]	34546	34688
Household head has no schooling or did not graduate from elementary school (=1)	34.2%	32.7%	0.015 [0.016]	36752	36727
Household head graduated from elementary school (=1)	48.6%	49.1%	-0.004 [0.015]	36752	36727
Household head graduated from junior school (=1)	11.2%	11.8%	-0.005 [0.008]	36752	36727
Total monthly percapita expenditure (nominal IDR)	168714.827 (90483.09)	171728.299 (92972.28)	-3013.472 [3210.465]	36801	36762
Monthly percapita food expenditure (nominal IDR)	115922.665 (57816.93)	117624.12 (61283.4)	-1701.455 [2223.926]	36801	36762
Monthly percapita non-food expenditure (nominal IDR)	64146.047 (195563.73)	60108.469 (119199.95)	4037.578 [3329.442]	36801	36762
Monthly percapita education expenditure (nominal IDR)	9256.116 (33181.4)	8700.908 (25438.67)	555.208 [826.155]	36785	36740
Monthly percapita health expenditure (nominal IDR)	4923.328 (27229.53)	4739.149 (22622.29)	184.179 [456.904]	36777	36757
Household has television (=1)	53%	54.2%	-0.012 [0.029]	36801	36755
Household has parabole antenna (=1)	0.9%	1.1%	-0.001 [0.002]	36801	36755
Household has refrigerator (=1)	3%	2.9%	0.001 [0.005]	36801	36755
Household has motorcycle/ outboard motor (=1)	16%	16.2%	-0.002 [0.014]	36801	36751
Household has car/motor boat (=1)	0.3%	0.4%	-0.001 [0.001]	36801	36751

Notes: The table provides the mean difference between households in treatment and control communities with standard errors clustered at sub-district level. The standard deviations are in parentheses and the clustered standard errors are in brackets, with * p<0.1, ** p<0.05, and ***p<0.01

Table A1: *Cont. Balance Check of Household Characteristics*

Variable	Treatment	Control	Difference	Treatment (N)	Control (N)
Household has pig (=1)	9.2%	11%	-0.018 [0.026]	36801	36755
Household has goat (=1)	11.7%	12.6%	-0.009 [0.014]	36801	36755
Household has cow (=1)	7.8%	8.9%	-0.011 [0.013]	36801	36755
Household has horse (=1)	0.6%	0.8%	-0.002 [0.004]	36801	36755
Participate in social service group (=1)	23.9%	25.4%	-0.015 [0.017]	36801	36762
Participate in production group (=1)	6.6%	6.4%	0.002 [0.013]	36801	36762
Participate in workers group (=1)	4.3%	4.5%	-0.001 [0.011]	36801	36762
Participate in natural resource management group (=1)	0.8%	1%	-0.002 [0.003]	36801	36762
Participate in credit/financial group (=1)	28.9%	31%	-0.022 [0.024]	36801	36762
Participate in governmental group (=1)	6.4%	6.6%	-0.002 [0.009]	36801	36762
Participate in religious group (=1)	59.3%	60.7%	-0.014 [0.022]	36801	36762
Participate in recreational group (=1)	2%	1.7%	0.003 [0.003]	36801	36762
Participate in mass/political organization (=1)	0.8%	0.8%	0.000 [0.002]	36801	36762
Ever received UCT (=1)	93.9%	92.6%	0.012* [0.007]	36801	36762
Has Askeskin (health insurance for poor)	49.7%	50%	-0.003 [-0.13]	36801	36762
Outpatient visits to public health services (=1)	12.8%	12.1%	0.007 [0.005]	36801	36762
Outpatient visits to private health services (=1)	3.7%	3.6%	0.001 [0.003]	36801	36762
Outpatient visits to public & private health services (=1)	16.5%	15.7%	0.007 [0.006]	36801	36762
Outpatient visits to traditional health services (=1)	0.9%	0.9%	-0.001 [0.002]	36801	36762
Outpatient visits to community health centers (=1)	5.1%	5.2%	0.000 [0.005]	36801	36762

Notes: The table provides the mean difference between households in treatment and control communities with standard errors clustered at sub-district level. The standard deviations are in parentheses and the clustered standard errors are in brackets, with * $p<0.1$, ** $p<0.05$, and *** $p<0.01$

Table A2: *Balance Check of Household Characteristics (World Bank Report)*

Variable	Treatment	Control	Difference	p	Treatment (N)	Control (N)
Household characteristics						
Household size	5.458	5.458	-0.003	1	36801	36762
Household head is female (=1)	0.0785	0.0729	0.0056	0.5	36801	36762
Household head working in agriculture (=1)	0.669	0.6591	0.01	0.75	36801	36762
Household head has no schooling or did not graduate from elementary school (=1)	0.3271	0.3213	0.0058	0.76	36801	36762
Household head graduated from elementary school (=1)	0.5076	0.5001	0.0075	0.71	36801	36762
Household head graduated from junior school (=1)	0.1068	0.1121	-0.0053	0.6	36801	36762
Total monthly percapita expenditure (nominal IDR)	191491.21	195353.66	-3862.46	0.52	36801	36762
Monthly percapita food expenditure (nominal IDR)	65327.88	65672	-344.11	0.94	36801	36762
Monthly percapita non-food expenditure (nominal IDR)	10535.69	10395.02	140.67	0.92	36801	36762
Monthly percapita food expenditure (nominal IDR)	4349.29	4317.2	32.08	0.96	36785	36740
Monthly percapita health expenditure (nominal IDR)	126163.32	129681.67	-3518.34	0.25	36777	36757
Household has television (=1)	0.5549	0.5518	0.0031	0.93	36801	36755
Household has parabole antenna (=1)	0.0097	0.0083	0.0014	0.61	36801	36755
Household has refrigerator (=1)	0.0318	0.027	0.0046	0.53	36801	36755
Household has motorcycle/outboard motor (=1)	0.1801	0.1921	-0.012	0.57	36801	36751
Household has car/motor boat (=1)	0.0021	0.0066	-0.0045	0.08	36801	36751
Household has pig (=1)	0.0839	0.0907	-0.0069	0.82	36801	36755
Household has goat (=1)	0.1195	0.1353	-0.0158	0.37	36801	36755
Household has cow (=1)	0.1022	0.1064	-0.0042	0.83	36801	36755
Household has horse (=1)	0.006	0.0119	-0.0059	0.4	36801	36755

Notes: The table provides the mean difference between households in treatment and control communities with standard errors clustered at sub-district level. The standard deviations are in parentheses and the clustered standard errors are in brackets, with * p<0.1, ** p<0.05, and ***p<0.01

Table A2: ***Cont.*** *Balance Check of Household Characteristics (World Bank Report)*

Variable	Treatment	Control	Difference	p	Treatment (N)	Control (N)
Household characteristics						
Participate in social service group (=1)	0.2254	0.2457	-0.0203	0.33	36801	36762
Participate in production group (=1)	0.052	0.0427	0.0093	0.38	36801	36762
Participate in workers group (=1)	0.0341	0.0314	0.0027	0.77	36801	36762
Participate in natural resource management group (=1)	0.0067	0.0062	0.0005	0.85	36801	36762
Participate in credit/financial group (=1)	0.31	0.3458	-0.0358	0.22	36801	36762
Participate in governmental group (=1)	0.0577	0.0625	-0.0048	0.61	36801	36762
Participate in religious group (=1)	0.6226	0.6395	-0.0169	0.58	36801	36762
Participate in recreational group (=1)	0.0188	0.022	-0.0032	0.51	36801	36762
Participate in mass/political organization (=1)	0.0082	0.0114	-0.0032	0.38	36801	36762
Ever received UCT (=1)	0.9372	0.9211	0.0161	0.12	36801	36762
Has Askeskin (health insurance for poor) (=1)	0.4803	0.4824	-0.0021	0.94	36801	36762
Outpatient visits to public health services (=1)	0.1106	0.1039	0.0068	0.36	36795	36755
Outpatient visits to private health services (=1)	0.0388	0.0378	0.0009	0.84	36801	36762
Outpatient visits to public & private health services (=1)	0.1494	0.1417	0.0077	0.39	36801	36762
Outpatient visits to traditional health services (=1)	0.0044	0.0038	0.0007	0.55	36015	35885
Outpatient visits to community health centers (=1)	0.0479	0.047	0.0009	0.85	31106	31280

Notes: The table provides the mean difference between households in treatment and control communities with standard errors clustered at sub-district level. The standard deviations are in parentheses and the clustered standard errors are in brackets, with * $p<0.1$, ** $p<0.05$, and ***$p<0.01$

Table A3: *Balance Check of Child Health Behavior (World Bank Report)*

Variable	Treatment	Control	Difference	p	Treatment (N)	Control (N)
Age appropriate vaccination (=1)	0.3923	0.3803	0.012	0.71	2846	2839
Completed immunization for children age 10 months or above (=1)	0.4815	0.4653	0.0162	0.69	1878	1867
Completed immunization (=1)	0.3528	0.3452	0.0076	0.8	2937	2927
BCG immunization (=1)	0.8126	0.7965	0.0161	0.48	2990	2988
1st Polio immunization (=1)	0.7997	0.7959	0.0038	0.87	2980	2969
2nd Polio immunization (=1)	0.6979	0.6831	0.0148	0.58	2954	2946
3rd Polio immunization (=1)	0.5933	0.5975	-0.0042	0.89	2945	2925
4th Polio immunization (=1)	0.4828	0.4714	0.0114	0.7	2936	2921
1st DPT immunization (=1)	0,7198	0.7025	0.0173	0.5	2946	2937
2nd DPT immunization (=1)	0.6187	0.6027	0.016	0.6	2930	2922
3rd DPT immunization (=1)	0.5381	0.5198	0.183	0.58	2924	2917
Measles immunization (=1)	0.5446	0.5637	-0.191	0.47	2952	2945
1st Hepatitis B immunization (=1)	0.6773	0.6791	-0.018	0.95	2943	2929
2nd Hepatitis B immunization (=1)	0.5719	0.5611	0.0108	0.73	2933	2921
3rd Hepatitis B immunization (=1)	0.5091	0.4815	0.0276	0.38	2932	2908
No weighing in last 2 months (=1)	0.269	0.2769	-0.0078	0.78	2934	2930
Weighed once in last 2 months (=1)	0.4001	0.4388	-0.0387	0.13	2934	2930
Weighed at least twice in last 2 months	0.3309	0.2844	0.0465	0.08	2934	2930
Child weighing frequency in last 2 months	1.0952	1.0421	0.0531	0.3	2934	2930
Received Vitamin A twice per year for age above 6 months (=1)	0.3581	0.384	-0.0259	0.36	2241	2198
Frequency of receiving Vitamin A	1.7361	1.8796	-0.1435	0.05	2877	2826
Number of opportunity to receive vitamin A	3.6071	3.6616	-0.0544	0.48	3019	3013
Rate of uptake of vitamin A from the official distribution	0.4795	0.52	-0.0405	0.11	2824	2765

Notes: The table provides the mean difference between households in treatment and control communities with standard errors clustered at sub-district level. The standard deviations are in parentheses and the clustered standard errors are in brackets, with * p<0.1, ** p<0.05, and ***p<0.01

Table A4: *Balance Check of Child Health Outcomes (World Bank Report)*

Variable	Treatment	Control	Difference	p	Treatment (N)	Control (N)
Incidence of diarrhea last month (=1)	0.2885	0.2614	0.0271	0.25	3075	3075
Diarrhea treated (=1)	0.5335	0.5576	-0.0241	0.56	847	803
Incidence of fever last month (=1)	0.4504	0.4466	0.0038	0.88	3076	3077
Incidence of cough last month (=1)	0.5467	0.5318	0.0149	0.54	3076	3077
Incidence of cough & rapid breath last month (=1)	0.2573	0.254	0.0033	0.88	3076	3077
Incidence of ARI last month (=1)	0.1772	0.175	0.0022	0.91	3076	3077
ARI treated (=1)	0.6451	0.6609	-0.0158	0.77	560	530
Incidence of illness last month (=1)	0.7222	0.701	0.0212	0.38	3075	3075
Incidence of diarrhea or ARI (=1)	0.3928	0.3692	0.0236	0.39	3075	3075
Weight-for-age: not malnourished (=1)	0.7655	0.7432	0.0223	0.31	2933	2914
Weight-for-age: malnourished (=1)	0.2345	0.2568	-0.0223	0.31	2933	2914
Weight-for-age: severe malnourished (=1)	0.0707	0.0775	-0.0068	0.59	2933	2914
Height-for-age: not malnourished (=1)	0.5054	0.4555	0.0499	0.09	2956	2932
Height-for-age: malnourished (=1)	0.4946	0.5445	-0.0499	0.09	2956	2932
Height-for-age: severe malnourished (=1)	0.3085	0.343	-0.0345	0.22	2956	2932
Weight-for-height: not malnourished (=1)	0.8695	0.8549	0.0146	0.37	2905	2885
Weight-for-height: malnourished (=1)	0.1305	0.1451	-0.0146	0.37	2905	2885
Weight-for-height: severe malnourished (=1)	0.0668	0.0568	0.01	0.42	2905	2885
Height (cm)	73.1693	72.4308	0.7385	0.2	3007	2996
Weight (kg)	9.0371	9.0949	-0.0578	0.62	2982	2976
Neonatal mortality per 1000 births in the village	41	27	14	0.14	3210	3239
Infant mortality per 1000 births in the village	81	54	27	0.04	3258	3283

Notes: The table provides the mean difference between households in treatment and control communities with standard errors clustered at sub-district level. The standard deviations are in parentheses and the clustered standard errors are in brackets, with * $p<0.1$, ** $p<0.05$, and *** $p<0.01$

Table A5: *Impact of the Program on Child Health Behaviors (LATE) - Java/Off-Java*

	Java		Off-Java	
	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs
Ever breastfed (=1)	0.0019 (0.014)	4231	0.0345** (0.017)	1877
Waiting time for breastfed after birth (hours)	-1.6580 (8.335)	4380	-1.7960 (3.333)	1924
Length of breastfeeding (months)	-0.7700 (1.225)	4094	0.2140 (1.270)	1830
Weighed once last month for age 0-11 months (=1)	0.2530* (0.142)	558	0.0995 (0.115)	357
Weighed once last month for age 1-3 years (=1)	0.2610*** (0.062)	2667	0.1810** (0.091)	1054
Weighed once last month for age 0-5 years (=1)	0.2960*** (0.056)	4205	0.1780** (0.070)	1870
Age appropriate vaccination (=1)	0.0344 (0.070)	3396	-0.0102 (0.087)	1585
Completed vaccination (=1)	0.0206 (0.069)	3404	0.0032 (0.087)	1586
Number of Vitamin A consumed	0.3410* (0.184)	3511	-0.0763 (0.223)	1576
Received Vitamin A twice last year (=1)	0.0311 (0.049)	3511	0.0219 (0.051)	1576
Child visits to traditional health facilities (frequency)	0.0044 (0.0065)	4464	-0.0064* (0.0036)	1957
All household visits to traditional health facilities (frequency)	-0.0086 (0.021)	43452	0.0212 (0.018)	14629
All household visits to traditional health facilities (=1)	-0.0051 (0.012)	43452	0.0144 (0.014)	14629
Child visits to public health facilities (frequency)	0.0752** (0.030)	4464	0.0910** (0.039)	1957
All visits to public health facilities (frequency)	0.1720 (0.107)	43452	0.4120** (0.181)	14629
All household visits to public health facilities (=1)	0.0801* (0.049)	43452	0.1680** (0.068)	14629
Child visits to private health facilities (frequency)	0.0081 (0.021)	4464	0.0112 (0.020)	1957
All household visits to private health facilities (frequency)	0.0531 (0.050)	43452	0.0451 (0.070)	14629
All household visits to private health facilities (=1)	0.0225 (0.030)	43452	-0.0030 (0.045)	14629

Standard errors, clustered at sub-district level, in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$
Instrument: random assignment; all estimations include control variables

Table A6: *Impact of the Program on Child Health Outcomes (LATE) - Java/Off-Java*

	Java		Off-Java	
	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs
Weight (kg)	0.0411 (0.243)	3794	-0.0435 (0.370)	1633
Weight-for-age	0.1720 (0.121)	3794	-0.2410 (0.186)	1633
Malnutrition (Weight-for-age $\leq$ -2)	-0.0864** (0.041)	3794	0.0907 (0.064)	1633
Severe malnutrition (Weight-for-age $\leq$ -3)	-0.0347 (0.025)	3794	0.0337 (0.037)	1633
Height-for-age	0.1250 (0.206)	3484	-0.6660*** (0.240)	1524
Weight-for-height	-0.0169 (0.184)	3437	0.1740 (0.233)	1499
Reported incidence of diarrhea (=1)	0.0050 (0.043)	4230	0.1100** (0.052)	1875
Treated Diarrhea (=1)	0.0079 (0.089)	884	0.3250** (0.126)	342
Frequency of diarrhea last month	0.0151 (0.119)	4201	0.0150 (0.100)	1859
Length of last incidence of diarrhea (days)	0.0435 (0.198)	4202	0.4230** (0.212)	1858
Reported incidence of ARI (=1)	0.0142 (0.036)	4153	0.0582 (0.038)	1851
Treated ARI (=1)	-0.0260 (0.108)	550	0.0521 (0.177)	162
Reported incidence of fever (=1)	0.1060** (0.054)	4229	0.0944 (0.061)	1875
Reported incidence of cough (=1)	-0.0032 (0.060)	4231	0.1040 (0.072)	1876
Incidence of cough & rapid breath (=1)	0.0018 (0.041)	4096	0.0437 (0.046)	1835
Reported incidence of illness (=1)	0.0448 (0.060)	4231	0.1250 (0.081)	1874
Number of mortality for age 0-28 days (=1)	-0.0039 (0.003)	8273	-0.0001 (0.004)	2518
Number of mortality for age 1-2 months (=1)	-0.0013 (0.001)	8273	0.0006 (0.003)	2518
Number of mortality for age 3-5 months (=1)	-0.0012 (0.001)	8273	-0.0003 (0.002)	2518
Number of mortality for age 6-11 months (=1)	0.0018 (0.002)	8273	0.0001 (0.004)	2518
Number of mortality for age 0-11 months (=1)	-0.0044 (0.004)	8273	0.0003 (0.007)	2518

Standard errors, clustered at sub-district level, in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$
Instrument: random assignment, all estimations include control variables

Table A7: *Impact of the Program on Child Health Behaviors (LATE) - Urban/Rural*

	Urban		Rural	
	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs
Ever breastfed (=1)	0.0185	4728	-0.00252	1380
	(0.0124)		(0.0240)	
Waiting time for breastfed after birth (hours)	2.186	4886	-18.70*	1418
	(6.546)		(9.726)	
Length of breastfeeding (months)	-0.927	4594	0.502	1330
	(1.068)		(1.745)	
Weighed once last month (=1)	0.170	719	0.201	196
	(0.110)		(0.169)	
Weighed once last month (=1)	0.221***	2849	0.306***	872
	(0.0632)		(0.0831)	
Weighed once last month (=1)	0.244***	4703	0.332***	1372
	(0.0536)		(0.0742)	
Age appropriate vaccination (=1)	0.0330	3833	0.0223	1148
	(0.0682)		(0.103)	
Completed vaccination (=1)	0.0292	3841	0.0187	1149
	(0.0671)		(0.104)	
Number of Vitamin A consumed	0.203	3913	0.267	1174
	(0.163)		(0.266)	
Received Vitamin A twice last year (=1)	0.0174	3913	0.0623	1174
	(0.0395)		(0.0770)	
Child visits to traditional health facilities (freq)	0.00333	5991	0.000335	4918
	(0.00371)		(0.00482)	
All household visits to traditional health facilities (freq)	0.00386	43931	-0.0286	14150
	(0.0191)		(0.0304)	
All household visits to traditional health facilities (=1)	-0.0000684	43931	-0.00677	14150
	(0.0117)		(0.0192)	
Child visits to public health facilities (frequency)	0.0728***	5991	0.0912***	4918
	(0.0253)		(0.0261)	
All visits to public health facilities (frequency)	0.286***	43931	0.138	14150
	(0.110)		(0.176)	
All household visits to public health facilities (=1)	0.123***	43931	0.0724	14150
	(0.0472)		(0.0769)	
Child visits to private health facilities (frequency)	0.0106	5991	0.00267	4918
	(0.0158)		(0.0165)	
All household visits to private health facilities (frequency)	0.0560	43931	0.0238	14150
	(0.0491)		(0.0717)	
All household visits to private health facilities (=1)	0.0102	43931	0.0235	14150
	(0.0307)		(0.0448)	

Standard errors, clustered at sub-district level, in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$
Instrument: random assignment, all estimations include control variables

Table A8: *Impact of the Program on Child Health Outcomes (LATE) - Urban/Rural*

	Urban		Rural	
	Coef(Std. Err)	Obs	Coef(Std. Err)	Obs
Weight (kg)	-0.1260 (0.249)	4188	0.1770 (0.356)	1239
Weight-for-age	-0.0405 (0.124)	4188	0.1480 (0.182)	1239
Malnutrition (Weight-for-age $\leq$ -2)	-0.0090 (0.042)	4188	-0.0280 (0.062)	1239
Severe malnutrition (Weight-for-age $\leq$ -3)	-0.0025 (0.025)	4188	-0.0318 (0.033)	1239
Height-for-age	-0.3300* (0.190)	3875	0.4560 (0.291)	1133
Weight-for-height	0.1880 (0.166)	3807	-0.5590* (0.304)	1129
Reported incidence of diarrhea (=1)	0.0346 (0.038)	4726	0.0751 (0.071)	1379
Treated Diarrhea (=1)	0.1080 (0.089)	930	0.1090 (0.143)	296
Frequency of diarrhea last month	-0.0261 (0.081)	4692	0.2130 (0.230)	1368
Length of last incidence of diarrhea (days)	0.1760 (0.165)	4693	0.1930 (0.303)	1367
Reported incidence of ARI (=1)	0.0455 (0.032)	4644	-0.0163 (0.045)	1360
Treated ARI (=1)	-0.0297 (0.109)	541	-0.0168 (0.148)	171
Reported incidence of fever (=1)	0.0979** (0.046)	4725	0.1380 (0.088)	1379
Reported incidence of cough (=1)	0.0595 (0.054)	4727	-0.0562 (0.088)	1380
Incidence of cough & rapid breath (=1)	0.0334 (0.037)	4593	-0.0449 (0.051)	1338
Reported incidence of illness (=1)	0.0826 (0.056)	4725	0.0515 (0.096)	1380
Number of mortality for age 0-28 days (=1)	-0.0045 (0.003)	8152	0.0030 (0.004)	2639
Number of mortality for age 1-2 months (=1)	-0.0012 (0.001)	8152	-0.0005 (0.003)	2639
Number of mortality for age 3-5 months (=1)	-0.0013 (0.001)	8152	0.0007 (0.002)	2639
Number of mortality for age 6-11 months (=1)	0.0005 (0.002)	8152	0.0045 (0.003)	2639
Number of mortality for age 0-11 months (=1)	-0.0058 (0.004)	8152	0.0057 (0.006)	2639

Standard errors, clustered at sub-district level, in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$
Instrument: random assignment, all estimations include control variables

Table A9: *World Bank's Impact of the Program on Child Health Behavior (LATE)*

	Covariates, baseline values & panel dummy		Baseline values & panel dummy		Covariates	
	Coef	Std err	Coef	Std.err	Coeff	Std. err
Health behaviors						
Breastfeeding: yes or no (=1)	0.001	0.01	-0.001	0.01	0.002	0.01
Breastfeeding: hours after delivery of first breastfeeding	-1.11	0.01	-1.1	1.43	0.15	0.39
Breastfeeding: total months of breatsfeeding	-0.05	0.37	-0.109	0.35	-1.456	1.53
1 weighing past month (0-11 mths) (=1)	0.01	0.04	0.046	0.04	0.009	0.04
1 weighing past month (1-3yrs) (=1)	0.097	0.03***	0.093	0.02***	0.1	0.02***
1 weighing past month (0-5 yrs) (=1)	0.147	0.02***	0.152	0.02***	0.149	0.02***
Immunization complete by schedule for age (=1)	0.03	0.02	0.021	0.02	0.029	0.02
Immunization complete (=1)	0.017	0.02	0.009	0.02	0.016	0.02
Vitamin A times received(frequency)	0.065	0.07	0.068	0.06	0.074	0.07
Received Vit A twice during past year (=1)	0.022	0.02	0.024	0.02	0.021	0.02
Traditional health facility outpatient visits	0.001	0	0.001	0	0.001	0
Traditional health facility outpatient visits (all HH members)	0.003	0	0.002	0	0.003	0
Traditional health facility outpatient visits (all HH members) (=1)	0	0	0	0	0	0
Public health facility outpatient visits	0.008	0*	0.008	0*	0.008	0**
Public health facility outpatient visits (all HH members)	0.028	0.01***	0.028	0.01***	0.029	0.01***
Public health facility outpatient visits (all HH members) (=1)	0.005	0***	0.005	0***	0.005	0***
Private health facility outpatient visits	0.002	0	0.001	0	0.002	0
Private health facility outpatient visits (all HH members)	0.017	0***	0.016	0.01***	0.002	0**
Private health facility outpatient visits (all HH members) (=1)	0.002	0**	0.002	0**	0.018	0.01***

Table A10: *World Bank's Impact of the Program on Child Health outcomes (LATE)*

	Covariates, baseline values & panel dummy		Baseline values & panel dummy		Covariates	
	Coef	Std err	Coef	Std.err	Coeff	Std. err
Health outcomes						
Weight (kg)	-0.197	0.11*	-0.16	0.1	-0.126	0.11
Weight-for-age	-0.041	0.06	0.002	0.06	-0.041	0.06
Weight-for-age malnutrition: zscore <-2 (=1)	-0.001	0.02	-0.011	0.02	-0.001	0.02
Weight-for-age severe malnutrition: zscore <-3 (=1)	0.01	0.01	0.007	0.01	0.009	0.01
Height-for-age	0.057	0.14	0.06	0.13	0.063	0.14
Weight-for-height	-0.118	0.12	-0.048	0.11	-0.121	0.12
Diarrhea last month (=1)	0.017	0.01	0.022	0.01**	0.018	0.01
Treated diarrhea (=1)	0.034	0.03	0.062	0.03**	0.043	0.03
Diarrhea frequency last month	-0.139	0.15	-0.135	0.15	-0.142	0.15
Length of last diarrhea (days)	0.173	0.2	0.211	0.19	0.168	0.2
Incidence of ARI (=1)	0.008	0.01	0.012	0.01	0.008	0.01
Treated ARI (=1)	0.039	0.04	0.053	0.04	0.040	0.04
Fever last month (=1)	0.039	0.01***	0.037	0.01***	0.041	0.01***
Cough last month (=1)	0	0.01	0.015	0.01	0.001	0.01
Cough and Rapid Breath (=1)	-0.001	0.01	0.007	0.01	-0.001	0.01
Illness (=1)	0.02	0.01	0.032	0.01**	0.021	0.01
Mortality 0-28 days(=1)	-0.002	0	-0.001	0	-0.005	0
Mortality 1-2 months (=1)	0.001	0	0.001	0	0.001	0
Mortality 3-5 months (=1)	0	0	-0.001	0	0	0
Mortality 6-11 months (=1)	0.003	0*	0.001	0	0.003	0
Mortality 0-11 months (=1)	0.002	0	0.002	0	-0.002	0

Table A11: *Hypothesis 3: Summary Statistics of Health Services at Baseline (Java/Off-Java)*

	Java						Off-Java					
	Treatment			Control			Treatment			Control		
	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs
From household data												
Hours needed to reach *posyandu*	0.156	0.16	1006	0.138	0.11	936	0.291	0.38	501	0.258	0.32	454
Distance to *posyandu* (km)	0.543	2.04	1007	0.37	0.47	932	0.656	1.23	502	0.588	0.92	454
Waiting time at *posyandu* (hour)	0.237	0.35	996	0.224	0.32	933	0.716	0.86	501	0.673	0.73	449
From village data												
Hours needed to reach *posyandu*	0.156	0.16	1006	0.138	0.11	936	0.291	0.38	501	0.258	0.32	454
Distance to *posyandu* (km)	0.543	2.04	1007	0.37	0.47	932	0.656	1.23	502	0.588	0.92	454
Waiting time at *posyandu* (hour)	0.237	0.35	996	0.224	0.32	933	0.716	0.86	501	0.673	0.73	449

Table A11: ***Cont.****Hypothesis 3: Summary Statistics of Health Services at Baseline (Java/Off-Java)*

	Java						**Off-Java**					
	Treatment			Control			Treatment			Control		
	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs
From *puskesmas* data												
Ratio of sub-*puskesmas* per household	0.293	0.38	128	0.260	0.24	128	1.221	1.10	49	0.935	0.75	51
Ratio of *posyandu* per household	5.668	5.91	128	5.539	4.43	129	8.527	6.46	49	6.266	4.98	51
Ratio of active *posyandu* per household	5.614	5.90	128	5.455	4.41	129	8.235	6.28	49	5.958	4.85	51
Current availability of Vitamin A (=1)	0.968	0.18	124	0.967	0.18	123	0.913	0.28	46	0.854	0.36	48
Current availability of BCG vaccine (=1)	0.976	0.15	126	1.000	0.00	129	0.894	0.31	47	0.961	0.20	51
Current availability of DPT vaccine (=1)	0.913	0.28	103	0.949	0.22	98	0.978	0.15	45	0.957	0.21	46
Current availability of DPT/ Hepatitis B combo vaccine (=1)	0.992	0.09	127	1.000	0.00	128	0.907	0.29	43	0.911	0.29	45
Current availability of Polio vaccine (=1)	1.000	0.00	128	0.992	0.09	129	0.979	0.15	47	0.961	0.20	51
Current availability of Hepatitis B vaccine (=1)	0.992	0.09	123	0.992	0.09	119	0.913	0.28	46	0.917	0.28	48
Current availability of measles vaccine (=1)	1.000	0.00	128	0.992	0.09	128	0.979	0.15	47	1.000	0.00	51

Table A11: ***Cont.****Hypothesis 3: Summary Statistics of Health Services at Baseline (Java/Off-Java)*

	Java						**Off-Java**					
	Treatment			Control			Treatment			Control		
	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs
From *puskesmas* data												
Weeks Vitamin A was not available last month	0.211	0.87	123	0.246	0.89	122	0.467	1.27	45	0.542	1.34	48
Weeks BCG was not available last month	0.392	1.08	125	0.281	0.98	128	0.404	1.14	47	0.549	1.39	51
Weeks DPT was not available last month	0.431	1.18	102	0.271	0.90	96	0.067	0.25	45	0.326	1.03	46
Weeks DPT/Hepatitis B combo vaccine was not available last month	0.167	0.76	126	0.205	0.81	127	0.405	1.08	42	0.533	1.31	45
Weeks Polio vaccine was not available last month	0.157	0.75	127	0.211	0.86	128	0.196	0.75	46	0.373	1.11	51
Weeks Hepatitis B vaccine was not available last month	0.172	0.77	122	0.246	0.87	118	0.511	1.22	45	0.521	1.20	48
Weeks Measles vaccine was not available last month	0.150	0.75	127	0.244	0.89	127	0.239	0.87	46	0.078	0.56	51

Table A12: *Hypothesis 3: Summary Statistics of Health Services at Baseline (Urban/Rural)*

	Urban						**Rural**					
	Treatment			Control			Treatment			Control		
	Mean	Std.Dev	Obs	Mean	Std.Dev	Obs	Mean	Std.Dev	Obs	Mean	Std.Dev	Obs
From household data												
Hours needed to reach *posyandu*	0.21	0.28	1220	0.189	0.23	1061	0.16	0.16	273	0.138	0.11	329
Distance to *posyandu* (km)	0.587	1.83	1222	0.471	0.72	1062	0.565	1.77	273	0.345	0.37	324
Waiting time at *posyandu* (hour)	0.419	0.65	1213	0.417	0.59	1055	0.269	0.39	270	0.219	0.28	327
From village data												
Hours needed to reach *posyandu*	0.21	0.28	1220	0.189	0.23	1061	0.16	0.16	273	0.138	0.11	329
Distance to *posyandu* (km)	0.587	1.83	1222	0.471	0.72	1062	0.565	1.77	273	0.345	0.37	324
Waiting time at *posyandu* (hour)	0.419	0.65	1213	0.417	0.59	1055	0.269	0.39	270	0.219	0.28	327

Table A12: ***Cont.*** *Hypothesis 3: Summary Statistics of Health Services at Baseline (Urban/Rural)*

	Urban						**Rural**					
	Treatment			Control			Treatment			Control		
	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs
From *puskesmas* data												
Ratio of sub-*puskesmas* per household	0.610	0.83	137	0.513	0.60	134	0.344	0.50	40	0.272	0.21	45
Ratio of *posyandu* per household	6.747	6.26	137	5.759	4.33	135	5.474	5.90	40	5.704	5.34	45
Ratio of active *posyandu* per household	6.610	6.18	137	5.623	4.23	135	5.412	5.82	40	5.521	5.37	45
Current availability of Vitamin A (=1)	0.969	0.17	130	0.930	0.26	128	0.900	0.30	40	0.953	0.21	43
Current availability of BCG vaccine (=1)	0.940	0.24	133	0.985	0.12	135	1.000	0.00	40	1.000	0.00	45
Current availability of DPT vaccine (=1)	0.941	0.24	119	0.955	0.21	110	0.897	0.31	29	0.941	0.24	34
Current availability of DPT/ Hepatitis B combo vaccine (=1)	0.962	0.19	131	0.969	0.17	130	1.000	0.00	39	1.000	0.00	43
Current availability of Polio vaccine (=1)	0.993	0.09	135	0.985	0.12	135	1.000	0.00	40	0.978	0.15	45
Current availability of Hepatitis B vaccine (=1)	0.962	0.19	130	0.960	0.20	124	1.000	0.00	39	1.000	0.00	43
Current availability of measles vaccine (=1)	0.993	0.09	135	1.000	0.00	135	1.000	0.00	40	0.977	0.15	44

Table A12: ***Cont.*** *Hypothesis 3: Summary Statistics of Health Services at Baseline (Urban/Rural)*

	Urban						**Rural**					
	Treatment			Control			Treatment			Control		
	Mean	Std.Dev	Obs	Mean	Std.Dev	Obs	Mean	Std.Dev	Obs	Mean	Std.Dev	Obs
From *puskesmas* data												
Weeks Vitamin A was not available last month	0.202	0.85	129	0.375	1.13	128	0.538	1.35	39	0.190	0.71	42
Weeks BCG was not available last month	0.459	1.17	133	0.407	1.19	135	0.179	0.72	39	0.205	0.85	44
Weeks DPT was not available last month	0.277	0.93	119	0.303	0.97	109	0.500	1.29	28	0.242	0.87	33
Weeks DPT/Hepatitis B combo vaccine was not available last month	0.262	0.90	130	0.308	1.00	130	0.105	0.65	38	0.238	0.88	42
Weeks Polio vaccine was not available last month	0.187	0.78	134	0.244	0.91	135	0.103	0.64	39	0.295	1.02	44
Weeks Hepatitis B vaccine was not available last month	0.302	0.98	129	0.363	1.01	124	0.132	0.66	38	0.214	0.87	42
Weeks Measles vaccine was not available last month	0.194	0.82	134	0.163	0.72	135	0.103	0.64	39	0.302	1.04	43

Table A13: *Hypothesis 3: Summary Statistics of Vaccine Availability at Baseline (Only West Java Province & East Nusa Tenggara Province)*

	West Java						East Nusa Tenggara					
	Treatment			Control			Treatment			Control		
	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs
From *puskesmas* data												
Current availability of Vitamin A (=1)	0.919	0.28	37	0.973	0.16	37	0.958	0.20	24	0.913	0.29	23
Current availability of BCG vaccine (=1)	0.975	0.16	40	1.000	0.00	41	0.880	0.33	25	0.923	0.27	26
Current availability of DPT vaccine (=1)	0.833	0.38	30	0.938	0.25	32	1.000	0.00	25	0.920	0.28	25
Current availability of DPT/ Hepatitis B combo vaccine (=1)	0.975	0.16	40	1.000	0.00	41	0.810	0.40	21	0.800	0.41	20
Current availability of Polio vaccine (=1)	1.000	0.00	40	0.976	0.16	41	1.000	0.00	25	0.923	0.27	26
Current availability of Hepatitis B vaccine (=1)	0.974	0.16	38	0.974	0.16	39	0.960	0.20	25	0.923	0.27	26
Current availability of measles vaccine (=1)	1.000	0.00	40	0.975	0.16	40	1.000	0.00	25	1.000	0.00	26

Table A14: *Hypothesis 3: Summary Statistics of Weeks of Vaccine Unavailable at Baseline (Only West Java Province & East Nusa Tenggara Province)*

	West Java						**East Nusa Tenggara**					
	Treatment			Control			Treatment			Control		
	Mean	Std.Dev	Obs	Mean	Std.Dev	Obs	Mean	Std.Dev	Obs	Mean	Std.Dev	Obs
From *puskesmas* data												
Weeks Vitamin A was not available last month	0.568	1.39	37	0.541	1.39	37	0.167	0.82	24	0.217	0.85	23
Weeks BCG was not available last month	0.575	1.30	40	0.390	1.20	41	0.640	1.50	25	0.769	1.61	26
Weeks DPT was not available last month	0.967	1.65	30	0.594	1.32	32	0.040	0.20	25	0.280	0.89	25
Weeks DPT/Hepatitis B combo vaccine was not available last month	0.425	1.15	40	0.463	1.23	41	0.667	1.43	21	0.800	1.51	20
Weeks Polio vaccine was not available last month	0.400	1.15	40	0.488	1.33	41	0.200	0.82	25	0.423	1.14	26
Weeks Hepatitis B vaccine was not available last month	0.447	1.18	38	0.513	1.27	39	0.320	0.95	25	0.115	0.43	26
Weeks Measles vaccine was not available last month	0.375	1.15	40	0.550	1.36	40	0.240	0.88	25	0.000	0.00	26

Table A15: *First Stage Estimation for Hypothesis 3*

	Indicator$_1$ (Availability of Health Services)		Indicator$_2$ (Weeks vaccine *not* available)	
	Received CCT	Received CCT * Indicator$_1$	Received CCT	Received CCT * Indicator$_2$
Health Behavior				
Random Assignment (=1)	0.396***	0.174***	0.398***	-0.057*
	(0.023)	(0.051)	(0.026)	(0.022)
Indicator$_i$	-0.007	0.092***	-0.013**	0.038*
	(0.009)	(0.032)	(0.006)	(0.021)
Random Assignment * Indicator$_i$	0.034***	0.484***	0.012	0.500***
	(0.012)	(0.052)	(0.009)	(0.049)
Observation	3824	3824	4097	4097
Adjusted R^2	0.241	0.546	0.237	0.484
F-stat	19.89	21.99	20.37	33.06
Health Outcomes				
Random Assignment (=1)	0.396***	0.147***	0.398***	-0.066***
	(0.023)	(0.054)	(0.026)	(0.022)
Indicator$_i$	0.031**	0.087**	-0.011	0.042*
	(0.012)	(0.035)	(0.007)	(0.023)
Random Assignment * $Indicator_i$	0.018	0.476***	0.011	0.498***
	(0.013)	(0.059)	(0.009)	(0.045)
Observation	3181	3181	3395	3395
Adjusted R^2	0.238	0.536	0.237	0.484
F-stat	19.01	17.7	19.34	48.41

Standard errors, clustered at sub-district level, in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Table A16: *First Stage Estimation for Hypothesis 4*

	Health behavior index	Growth Monitoring	Vitamin A consumption	Vaccination as scheduled by age
Random Assignment (=1)	0.049***	0.107***	0.008	0.011
	(0.014)	(0.018)	(0.016)	(0.024)
Observation	5426	5393	4602	4455
Adj R^2	0.024	0.031	0.039	0.018
F-stat	3.59	4.19	5.66	3.05

Standard errors, clustered at sub-district level, in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Appendix B

Table B1: *OLS Estimation of the Impact of Religiosity (Self-Assessment) on Women's Decision-making Power (IFLS 2007)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time-use decisions	Fertility decisions
Religiosity (self-assessment)	-0.023	0.005	-0.014	-0.004	-0.017*	0.011
	(0.050)	(0.012)	(0.032)	(0.016)	(0.010)	(0.006)
Wife's age	0.114***	0.013	0.058**	0.020	0.020**	-0.004
	(0.042)	(0.011)	(0.027)	(0.014)	(0.008)	(0.006)
Wife age^2	-0.001**	-0.000	-0.001	-0.000	-0.000	0.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Religion is Islam (=1)	-0.005	-0.098**	0.188	-0.018	-0.094***	0.016
	(0.213)	(0.048)	(0.143)	(0.061)	(0.028)	(0.024)
Wife's years of education	-0.029**	-0.007**	-0.020**	-0.002	0.000	-0.002
	(0.011)	(0.003)	(0.008)	(0.003)	(0.002)	(0.002)
Ratio of wife's years of education to husband's	0.114**	0.040***	0.056	0.015	0.007	-0.001
	(0.056)	(0.014)	(0.036)	(0.013)	(0.010)	(0.007)
Husband is employed (=1)	-0.531**	-0.026	-0.208	-0.182**	-0.082	-0.048
	(0.240)	(0.058)	(0.161)	(0.073)	(0.052)	(0.040)
Log per-capita expenditure	0.058	0.030	-0.061	0.073***	0.042***	-0.024**
	(0.070)	(0.018)	(0.049)	(0.023)	(0.015)	(0.012)
Live with wife's parents (=1)	0.242**	0.004	0.180**	0.085**	0.006	-0.031
	(0.121)	(0.036)	(0.083)	(0.039)	(0.027)	(0.019)
Live with husband's parents (=1)	-0.374***	-0.048	-0.177**	-0.134***	0.005	-0.015
	(0.126)	(0.033)	(0.088)	(0.039)	(0.029)	(0.023)
Ambilocal kinship norms (=1)	0.074	-0.038	0.066	0.008	0.051**	-0.024
	(0.129)	(0.028)	(0.099)	(0.036)	(0.024)	(0.022)
Patrilocal kinship norms (=1)	-0.197	-0.106***	-0.088	-0.053	0.047	-0.003
	(0.152)	(0.034)	(0.108)	(0.041)	(0.030)	(0.022)
Java	0.336***	-0.012	0.250***	0.010	0.031	0.062***
	(0.122)	(0.027)	(0.091)	(0.032)	(0.023)	(0.018)

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Control variable estimates that are not statistically significant are not presented.
These control variables are:
ratio of wife's age to husband's, household size, number of children in household and urban.

Table B2: *OLS Estimation of the Impact of Religiosity (Religious Practice) on Women's Decision-making Power (IFLS 2007)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
Religiosity (religious practice)	-0.064	-0.009	0.012	-0.053***	-0.024**	0.011
	(0.055)	(0.013)	(0.041)	(0.017)	(0.011)	(0.009)
Wife's age	0.110**	0.016	0.050*	0.019	0.027***	-0.011*
	(0.042)	(0.012)	(0.028)	(0.014)	(0.009)	(0.006)
Wife age^2	-0.001*	-0.000	-0.001	-0.000	-0.000**	0.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Religion is Islam (=1)	-0.005	-0.102**	0.200	-0.028	-0.092***	0.016
	(0.214)	(0.048)	(0.146)	(0.061)	(0.028)	(0.025)
Wife's years of education	-0.026**	-0.006**	-0.017**	-0.002	0.001	-0.002
	(0.012)	(0.003)	(0.008)	(0.003)	(0.002)	(0.002)
Ratio of wife's years of education to husband's	0.102*	0.035**	0.050	0.013	0.010	-0.005
	(0.057)	(0.014)	(0.038)	(0.014)	(0.011)	(0.008)
Husband is employed (=1)	-0.449*	-0.005	-0.196	-0.154**	-0.059	-0.050
	(0.239)	(0.058)	(0.170)	(0.064)	(0.055)	(0.042)
Log per-capita expenditure	0.085	0.034*	-0.047	0.081***	0.043***	-0.026**
	(0.073)	(0.019)	(0.051)	(0.023)	(0.015)	(0.012)
Live with wife's parents (=1)	0.235*	0.002	0.201**	0.068*	-0.001	-0.034*
	(0.129)	(0.038)	(0.088)	(0.041)	(0.029)	(0.020)
Live with husband's parents (=1)	-0.359***	-0.049	-0.178**	-0.125***	0.018	-0.019
	(0.128)	(0.034)	(0.090)	(0.041)	(0.028)	(0.023)
Ambilocal kinship norms (=1)	0.101	-0.033	0.088	0.011	0.047*	-0.023
	(0.132)	(0.028)	(0.102)	(0.037)	(0.025)	(0.022)
Patrilocal kinship norms (=1)	-0.142	-0.095***	-0.056	-0.041	0.045	-0.000
	(0.154)	(0.035)	(0.110)	(0.042)	(0.029)	(0.023)
Java	0.359***	-0.001	0.248***	0.026	0.030	0.062***
	(0.125)	(0.028)	(0.093)	(0.033)	(0.024)	(0.018)

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Control variable estimates that are not statistically significant are not presented.
These control variables are:
ratio of wife's age to husband's, household size, number of children in household and urban.

Table B3: *OLS Estimation of the Impact of Religiosity (Self-Assessment) on Women's Decision-making Power (IFLS 2014)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
Religiosity (self-assessment)	-0.192***	-0.049***	-0.099***	-0.041*	0.002	-0.007
	(0.059)	(0.017)	(0.028)	(0.024)	(0.013)	(0.008)
Wife's age	0.254***	0.025	0.141***	0.051**	0.027**	0.004
	(0.053)	(0.015)	(0.026)	(0.022)	(0.011)	(0.008)
Wife age^2	-0.003***	-0.000	-0.002***	-0.000	-0.000	-0.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Wife's years of education	-0.017	-0.017***	-0.013	0.016**	0.003	-0.006***
	(0.017)	(0.005)	(0.008)	(0.007)	(0.003)	(0.002)
Ratio of wife's age to husband's	-0.780	0.137	-0.653**	-0.209	0.181*	-0.145**
	(0.509)	(0.155)	(0.255)	(0.207)	(0.102)	(0.071)
Ratio of wife's years of education to husband's	0.099	0.068***	0.032	0.008	-0.005	0.004
	(0.079)	(0.026)	(0.033)	(0.029)	(0.014)	(0.009)
Husband is employed (=1)	-0.982**	-0.348***	0.028	-0.346	-0.300***	-0.048
	(0.495)	(0.125)	(0.188)	(0.220)	(0.085)	(0.051)
Number of children in household	0.189***	0.045**	0.069**	0.025	-0.005	0.008
	(0.064)	(0.019)	(0.031)	(0.028)	(0.014)	(0.009)
Log per-capita expenditure	0.114	-0.039	-0.018	0.096**	0.059***	0.024*
	(0.103)	(0.031)	(0.049)	(0.041)	(0.021)	(0.013)
Live with wife's parents (=1)	0.300*	-0.083*	0.252***	0.197**	-0.033	-0.022
	(0.177)	(0.050)	(0.080)	(0.085)	(0.035)	(0.021)
Live with husband's parents (=1)	-0.933***	-0.161***	-0.370***	-0.249***	-0.103***	-0.044
	(0.192)	(0.054)	(0.095)	(0.089)	(0.036)	(0.029)
Ambilocal kinship norms (=1)	0.319*	0.033	0.223**	0.026	0.015	0.027
	(0.166)	(0.044)	(0.088)	(0.065)	(0.031)	(0.022)
Patrilocal kinship norms (=1)	-0.473**	-0.181***	-0.032	-0.207***	-0.036	-0.029
	(0.198)	(0.053)	(0.102)	(0.065)	(0.032)	(0.023)
Urban (=1)	-0.149	0.022	-0.142*	0.034	-0.050**	0.001
	(0.149)	(0.041)	(0.075)	(0.054)	(0.025)	(0.018)
Java	0.210	0.046	0.161**	-0.008	-0.033	0.059***
	(0.153)	(0.042)	(0.078)	(0.059)	(0.028)	(0.019)

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Control variable estimates that are not statistically significant are not presented (household size).

Table B4: *OLS Estimation of the Impact of Religiosity (Religious Practice) on Women's Decision-making Power (IFLS 2014)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
Religiosity (religious practice)	-0.095	-0.043**	-0.038	0.027	-0.023*	-0.024**
	(0.069)	(0.019)	(0.035)	(0.027)	(0.013)	(0.009)
Wife's age	0.262***	0.024	0.147***	0.043*	0.037***	0.004
	(0.056)	(0.016)	(0.028)	(0.023)	(0.012)	(0.008)
Wife age^2	-0.003***	-0.000	-0.002***	-0.000	-0.000**	-0.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Wife's years of education	-0.014	-0.015***	-0.012	0.016**	0.004	-0.006***
	(0.018)	(0.005)	(0.009)	(0.007)	(0.003)	(0.002)
Ratio of wife's age to husband's	-0.923*	0.099	-0.725***	-0.176	0.120	-0.160**
	(0.528)	(0.161)	(0.265)	(0.212)	(0.107)	(0.073)
Ratio of wife's years of education to husband's	0.090	0.067**	0.022	0.012	-0.007	0.004
	(0.083)	(0.027)	(0.034)	(0.030)	(0.015)	(0.009)
Husband is employed (=1)	-1.010*	-0.362***	0.002	-0.319	-0.307***	-0.053
	(0.526)	(0.133)	(0.197)	(0.234)	(0.089)	(0.052)
Number of children in household	0.195***	0.055***	0.069**	0.025	-0.008	0.009
	(0.065)	(0.019)	(0.033)	(0.029)	(0.014)	(0.009)
Log per-capita expenditure	0.144	-0.033	-0.004	0.094**	0.065***	0.030**
	(0.105)	(0.032)	(0.050)	(0.041)	(0.022)	(0.014)
Live with wife's parents (=1)	0.265	-0.093*	0.217***	0.192**	-0.030	-0.011
	(0.176)	(0.050)	(0.082)	(0.084)	(0.036)	(0.022)
Live with husband's parents (=1)	-0.980***	-0.171***	-0.401***	-0.273***	-0.093**	-0.039
	(0.197)	(0.056)	(0.097)	(0.092)	(0.037)	(0.029)
Ambilocal kinship norms (=1)	0.298*	0.031	0.195**	0.023	0.023	0.032
	(0.169)	(0.044)	(0.090)	(0.068)	(0.031)	(0.022)
Patrilocal kinship norms (=1)	-0.456**	-0.173***	-0.038	-0.197***	-0.031	-0.027
	(0.202)	(0.053)	(0.106)	(0.067)	(0.033)	(0.023)
Urban (=1)	-0.132	0.029	-0.131*	0.037	-0.055**	0.002
	(0.150)	(0.041)	(0.077)	(0.054)	(0.025)	(0.018)
Java	0.246	0.064	0.189**	-0.012	-0.035	0.056***
	(0.155)	(0.042)	(0.080)	(0.059)	(0.029)	(0.020)

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Control variable estimates that are not statistically significant are not presented (household size).

Table B5: *Fixed-effect Estimation of the Impact of Religiosity (Self-Assessment) on Women's Decision-making Power*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
Religiosity (self-assessment)	-0.049	-0.014	-0.019	-0.005	-0.013	0.003
	(0.057)	(0.017)	(0.032)	(0.023)	(0.013)	(0.009)
Wife's age	0.261***	0.092***	0.164***	0.019	-0.030**	0.021*
	(0.061)	(0.020)	(0.035)	(0.025)	(0.013)	(0.011)
Religion is Islam (=1)	0.726	0.022	0.549	-0.204	0.448*	-0.114
	(1.177)	(0.309)	(0.650)	(0.386)	(0.242)	(0.221)
Ratio of wife's years of education to husband's	-0.029	0.024	0.038	-0.075*	-0.005	-0.009
	(0.112)	(0.033)	(0.059)	(0.039)	(0.021)	(0.015)
Husband is employed (=1)	-0.411	-0.240**	0.076	-0.099	-0.159**	-0.033
	(0.378)	(0.120)	(0.183)	(0.174)	(0.079)	(0.062)
Household size	-0.039	0.000	-0.004	-0.015	-0.005	-0.011*
	(0.041)	(0.011)	(0.024)	(0.017)	(0.009)	(0.006)
Number of children in household	-0.043	-0.015	-0.001	-0.013	-0.023*	-0.011
	(0.069)	(0.021)	(0.041)	(0.030)	(0.014)	(0.010)
Log per-capita expenditure	-0.324***	-0.060*	-0.119*	-0.088*	0.004	-0.063***
	(0.104)	(0.035)	(0.063)	(0.046)	(0.027)	(0.018)
Live with wife's parents (=1)	-0.084	-0.062	0.184	-0.056	-0.075	-0.073**
	(0.214)	(0.060)	(0.121)	(0.093)	(0.054)	(0.037)
Live with husband's parents (=1)	-0.376	-0.007	-0.334**	-0.117	0.054	0.030
	(0.258)	(0.075)	(0.140)	(0.095)	(0.051)	(0.038)
Urban (=1)	0.237	0.021	0.048	0.117*	0.072	-0.002
	(0.180)	(0.064)	(0.114)	(0.068)	(0.047)	(0.030)
Java	-0.342	-0.059	0.154	-0.208	-0.275**	0.126
	(0.598)	(0.179)	(0.408)	(0.209)	(0.139)	(0.106)

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Control variable estimates that are not statistically significant are not presented.
These control variables are: wife age^2, wife's years of education, and ratio of wife's age to husband's.
The estimations also include, although not presented, age fixed-effect and birth month by province fixed effect.

Table B6: *Fixed-effect Estimation of the Impact of Religiosity (Religious Practice) on Women's Decision-making Power*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
Religiosity (religious practice)	-0.009	0.021	-0.002	0.018	-0.030*	-0.011
	(0.070)	(0.020)	(0.043)	(0.028)	(0.016)	(0.012)
Wife's age	0.255***	0.089***	0.166***	0.011	-0.023*	0.012
	(0.067)	(0.022)	(0.038)	(0.028)	(0.014)	(0.011)
Wife age^2	-0.000	-0.000	-0.001	0.001*	-0.000	0.000
	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Religion is Islam (=1)	0.686	0.017	0.544	-0.209	0.435*	-0.127
	(1.173)	(0.309)	(0.653)	(0.387)	(0.242)	(0.221)
Wife's years of education	0.022	-0.000	-0.001	0.010	0.007	0.012*
	(0.038)	(0.012)	(0.023)	(0.014)	(0.009)	(0.006)
Husband is employed (=1)	-0.465	-0.283**	0.107	-0.132	-0.172**	-0.043
	(0.400)	(0.124)	(0.195)	(0.187)	(0.083)	(0.066)
Number of children in household	-0.026	-0.014	0.016	-0.007	-0.028*	-0.011
	(0.073)	(0.022)	(0.042)	(0.032)	(0.014)	(0.011)
Log per-capita expenditure	-0.303***	-0.053	-0.113*	-0.080*	0.007	-0.063***
	(0.111)	(0.036)	(0.067)	(0.048)	(0.028)	(0.019)
Live with wife's parents (=1)	-0.177	-0.070	0.119	-0.043	-0.100*	-0.082**
	(0.227)	(0.066)	(0.129)	(0.096)	(0.056)	(0.040)
Live with husband's parents (=1)	-0.440	-0.001	-0.344**	-0.135	0.042	0.002
	(0.268)	(0.079)	(0.146)	(0.100)	(0.052)	(0.038)
Java	-0.358	-0.057	0.132	-0.182	-0.282*	0.105
	(0.633)	(0.192)	(0.425)	(0.222)	(0.149)	(0.107)

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Control variable estimates that are not statistically significant are not presented.
These control variables are: ratio of wife's age to husband's, ratio of wife's years of education to husband's, urban, and household size.
The estimations also include, although not presented, age fixed-effect and birth month by province fixed effect.

Table B7: *IV Estimation of the Impact of Religiosity (Self-Assessment) on Women's Decision-making Power (IFLS 2007)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
Religiosity (self-assessment)	-0.205	-0.046	-0.050	-0.056	-0.066	0.028
	(0.381)	(0.102)	(0.268)	(0.105)	(0.075)	(0.066)
Wife's age	0.116***	0.009	0.058**	0.020	0.024***	-0.004
	(0.045)	(0.011)	(0.029)	(0.015)	(0.009)	(0.007)
Wife ageˆ2	-0.001*	-0.000	-0.001	-0.000	-0.000**	0.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Religion is Islam (=1)	-0.053	-0.115*	0.182	-0.027	-0.109***	0.022
	(0.281)	(0.069)	(0.191)	(0.077)	(0.040)	(0.037)
Wife's years of education	-0.027**	-0.006**	-0.019**	-0.002	0.001	-0.002
	(0.011)	(0.003)	(0.008)	(0.003)	(0.002)	(0.002)
Ratio of wife's years of education to husband's	0.113**	0.038***	0.058	0.014	0.006	-0.001
	(0.056)	(0.014)	(0.037)	(0.013)	(0.010)	(0.008)
Husband is employed (=1)	-0.470*	-0.014	-0.160	-0.173**	-0.093*	-0.047
	(0.246)	(0.060)	(0.164)	(0.075)	(0.051)	(0.041)
Log per-capita expenditure	0.051	0.031	-0.070	0.073***	0.043***	-0.026**
	(0.075)	(0.019)	(0.051)	(0.025)	(0.016)	(0.013)
Live with wife's parents (=1)	0.224*	0.007	0.165*	0.083**	0.006	-0.033*
	(0.122)	(0.037)	(0.086)	(0.040)	(0.028)	(0.020)
Live with husband's parents (=1)	-0.380***	-0.042	-0.194**	-0.132***	0.006	-0.012
	(0.127)	(0.034)	(0.089)	(0.039)	(0.029)	(0.023)
Ambilocal kinship norms (=1)	0.071	-0.037	0.059	0.010	0.053**	-0.025
	(0.131)	(0.029)	(0.103)	(0.038)	(0.025)	(0.023)
Patrilocal kinship norms (=1)	-0.153	-0.095***	-0.074	-0.039	0.049	0.000
	(0.154)	(0.036)	(0.109)	(0.042)	(0.032)	(0.024)
Java	0.400***	0.005	0.273**	0.026	0.036	0.064***
	(0.149)	(0.034)	(0.111)	(0.034)	(0.027)	(0.022)

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variables are: community-level self-assessed religiosity, community-level religious practice, and more than 75 percent village population participation in religious practice.
Control variable estimates that are not statistically significant are not presented.
These control variables are: ratio of wife's age to husband's, household size, number of children in household and urban.

Table B8: *IV Estimation of the Impact of Religiosity (Religious Practice) on Women's Decision-making Power (IFLS 2007)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
Religiosity (religious practice)	-0.863**	-0.107	-0.441*	-0.257***	-0.013	-0.045
	(0.356)	(0.089)	(0.227)	(0.090)	(0.054)	(0.050)
Wife's age	0.138***	0.015	0.068**	0.025	0.030***	-0.008
	(0.047)	(0.012)	(0.030)	(0.015)	(0.009)	(0.006)
Wife age^2	-0.001**	-0.000	-0.001	-0.000	-0.000***	0.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Religion is Islam (=1)	-0.173	-0.124**	0.098	-0.065	-0.084***	-0.001
	(0.225)	(0.056)	(0.150)	(0.062)	(0.030)	(0.028)
Ratio of wife's age to husband's	-0.588	-0.109	-0.520**	-0.005	0.049	0.024
	(0.388)	(0.097)	(0.258)	(0.137)	(0.076)	(0.064)
Ratio of wife's years of education to husband's	0.098*	0.033**	0.048	0.011	0.010	-0.004
	(0.058)	(0.014)	(0.039)	(0.014)	(0.011)	(0.008)
Husband is employed (=1)	-0.334	0.013	-0.115	-0.133**	-0.071	-0.043
	(0.250)	(0.060)	(0.176)	(0.066)	(0.055)	(0.045)
Log per-capita expenditure	0.083	0.036*	-0.050	0.082***	0.041***	-0.025*
	(0.078)	(0.019)	(0.054)	(0.025)	(0.016)	(0.013)
Live with wife's parents (=1)	0.181	-0.001	0.163*	0.058	0.001	-0.039*
	(0.132)	(0.040)	(0.091)	(0.042)	(0.029)	(0.021)
Live with husband's parents (=1)	-0.350***	-0.041	-0.188**	-0.117***	0.019	-0.017
	(0.130)	(0.035)	(0.092)	(0.042)	(0.027)	(0.024)
Ambilocal kinship norms (=1)	0.105	-0.033	0.090	0.015	0.045*	-0.022
	(0.140)	(0.029)	(0.108)	(0.037)	(0.026)	(0.023)
Patrilocal kinship norms (=1)	-0.038	-0.080**	-0.002	-0.013	0.042	0.008
	(0.157)	(0.034)	(0.115)	(0.044)	(0.030)	(0.024)
Java	0.562***	0.028	0.363***	0.075**	0.024	0.078***
	(0.148)	(0.033)	(0.107)	(0.036)	(0.026)	(0.021)

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variables are: community-level self-assessed religiosity, community-level religious practice, and more than 75 percent village population participation in religious practice.
Control variable estimates that are not statistically significant are not presented.
These control variables are: wife's years of education, household size, number of children in household and urban.

Table B9: *IV Estimation of the Impact of Religiosity (Self-Assessment) on Women's Decision-making Power (IFLS 2014)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
Religiosity (self-assessment)	-1.821***	-0.488***	-1.030***	-0.151	-0.115	-0.095*
	(0.513)	(0.134)	(0.279)	(0.161)	(0.088)	(0.051)
Wife's age	0.340***	0.044**	0.206***	0.052**	0.029**	0.008
	(0.071)	(0.020)	(0.037)	(0.026)	(0.014)	(0.009)
Wife age^2	-0.004***	-0.000*	-0.002***	-0.000	-0.000	-0.000
	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Religion is Islam (=1)	-0.302	-0.115	-0.039	-0.021	-0.148***	-0.024
	(0.362)	(0.093)	(0.189)	(0.122)	(0.055)	(0.037)
Wife's years of education	-0.032	-0.020***	-0.025**	0.018**	0.001	-0.005**
	(0.023)	(0.006)	(0.012)	(0.008)	(0.004)	(0.002)
Ratio of wife's age to husband's	-0.789	0.190	-0.776**	-0.139	0.217*	-0.169**
	(0.624)	(0.191)	(0.312)	(0.238)	(0.126)	(0.083)
Ratio of wife's years of education to husband's	0.058	0.058**	0.009	0.006	-0.012	0.004
	(0.093)	(0.028)	(0.040)	(0.031)	(0.016)	(0.009)
Husband is employed (=1)	-1.530**	-0.556***	-0.191	-0.462*	-0.336***	-0.056
	(0.652)	(0.162)	(0.258)	(0.259)	(0.109)	(0.066)
Household size	-0.021	0.007	-0.027**	-0.002	0.004	0.002
	(0.027)	(0.008)	(0.012)	(0.011)	(0.005)	(0.004)
Number of children in household	0.138*	0.029	0.052	0.020	-0.004	-0.001
	(0.082)	(0.022)	(0.040)	(0.033)	(0.016)	(0.011)
Log per-capita expenditure	0.082	-0.042	-0.020	0.079*	0.050**	0.022
	(0.131)	(0.037)	(0.062)	(0.047)	(0.024)	(0.015)
Live with wife's parents (=1)	0.419*	-0.057	0.305***	0.206**	-0.017	-0.013
	(0.232)	(0.063)	(0.104)	(0.098)	(0.040)	(0.024)
Live with husband's parents (=1)	-0.750***	-0.154**	-0.305**	-0.162*	-0.062	-0.066**
	(0.242)	(0.068)	(0.122)	(0.094)	(0.040)	(0.032)
Ambilocal kinship norms (=1)	0.446**	0.074	0.313***	0.015	-0.002	0.053**
	(0.211)	(0.057)	(0.111)	(0.081)	(0.039)	(0.027)
Patrilocal kinship norms (=1)	-0.349	-0.130*	0.043	-0.221***	-0.058	0.001
	(0.250)	(0.067)	(0.129)	(0.080)	(0.040)	(0.026)
Urban (=1)	-0.219	-0.004	-0.191**	0.044	-0.061**	0.000
	(0.181)	(0.052)	(0.091)	(0.064)	(0.028)	(0.020)
Java	0.209	0.079	0.126	-0.000	-0.048	0.067***
	(0.202)	(0.053)	(0.103)	(0.070)	(0.033)	(0.022)

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variables are: community-level self-assessed religiosity, community-level religious practice, and more than 75 percent village population participation in religious practice.

Table B10: *IV Estimation of the Impact of Religiosity (Religious Practice) on Women's Decision-making Power (IFLS 2014)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
Religiosity	-1.315***	-0.346***	-0.665***	-0.200	-0.056	-0.087**
(religious practice)	(0.377)	(0.100)	(0.200)	(0.125)	(0.065)	(0.043)
Wife's age	0.257***	0.019	0.159***	0.039	0.028**	0.005
	(0.061)	(0.018)	(0.031)	(0.026)	(0.013)	(0.009)
Wife age^2	-0.002**	-0.000	-0.002***	-0.000	-0.000	-0.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Religion	0.378	0.064	0.337*	0.049	-0.106**	0.007
is Islam (=1)	(0.383)	(0.093)	(0.202)	(0.121)	(0.046)	(0.031)
Wife's years	0.024	-0.005	0.004	0.024***	0.004	-0.003
of education	(0.022)	(0.006)	(0.011)	(0.008)	(0.004)	(0.002)
Ratio of wife's	-0.907	0.145	-0.844***	-0.108	0.190	-0.178**
age to husband's	(0.636)	(0.194)	(0.308)	(0.247)	(0.130)	(0.086)
Ratio of wife's years	0.044	0.056**	-0.002	0.007	-0.015	0.005
of education to husband's	(0.090)	(0.028)	(0.036)	(0.032)	(0.017)	(0.009)
Husband is	-1.231*	-0.466***	0.002	-0.431	-0.333***	-0.052
employed (=1)	(0.652)	(0.164)	(0.239)	(0.271)	(0.107)	(0.066)
Household size	-0.010	0.007	-0.022*	0.001	0.005	0.002
	(0.025)	(0.007)	(0.012)	(0.012)	(0.005)	(0.003)
Number of children	0.206***	0.051**	0.086**	0.028	-0.002	0.003
in household	(0.075)	(0.021)	(0.037)	(0.033)	(0.016)	(0.010)
Log per-capita	0.186	-0.012	0.031	0.097**	0.052**	0.031**
expenditure	(0.129)	(0.038)	(0.061)	(0.048)	(0.025)	(0.016)
Live with	0.308	-0.068	0.235***	0.195**	-0.029	-0.012
wife's parents (=1)	(0.197)	(0.054)	(0.089)	(0.095)	(0.039)	(0.024)
Live with	-0.707***	-0.142**	-0.283**	-0.163	-0.067	-0.062*
husband's parents (=1)	(0.234)	(0.064)	(0.118)	(0.100)	(0.041)	(0.032)
Ambilocal	0.388*	0.057	0.252**	0.030	-0.003	0.056**
kinship norms (=1)	(0.207)	(0.053)	(0.107)	(0.084)	(0.038)	(0.026)
Patrilocal	-0.253	-0.097	0.066	-0.169*	-0.061	0.004
kinship norms (=1)	(0.265)	(0.068)	(0.136)	(0.088)	(0.042)	(0.028)
Urban (=1)	-0.046	0.043	-0.093	0.056	-0.049*	0.012
	(0.178)	(0.049)	(0.090)	(0.062)	(0.029)	(0.020)
Java	0.392**	0.134***	0.226**	0.024	-0.043	0.070***
	(0.193)	(0.049)	(0.099)	(0.073)	(0.035)	(0.023)

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variables are: community-level self-assessed religiosity, community-level religious practice, and more than 75 percent village population participation in religious practice.

Table B11: *OLS Estimation of the Impact of Religiosity (Self-Assessment) on Indirect Proxy of Women's Autonomy (IFLS 2007)*

	Currently use birth control	Number of *arisan* groups joined	Number of *arisan meetings* attended last year	Wife's shares of *all* hh assets	Wife's shares of *non-liquid* hh assets	Currently employed
Religiosity (self-assessment)	0.010	0.023	0.830***	-0.498*	-1.094*	0.010
	(0.008)	(0.015)	(0.301)	(0.281)	(0.590)	(0.009)
Wife's age	0.050***	0.035***	0.842***	0.055	1.045*	0.046***
	(0.008)	(0.011)	(0.292)	(0.286)	(0.576)	(0.008)
Wife age^2	-0.001***	-0.000	-0.008*	0.000	-0.011	-0.000***
	(0.000)	(0.000)	(0.005)	(0.004)	(0.008)	(0.000)
Religion is Islam (=1)	0.039	0.083	2.406***	0.386	3.919*	-0.138***
	(0.043)	(0.064)	(0.867)	(0.980)	(2.036)	(0.032)
Wife's years of education	-0.004	0.041***	0.342***	-0.116	-0.248**	0.001
	(0.003)	(0.005)	(0.104)	(0.074)	(0.123)	(0.002)
Ratio of wife's age to husband's	0.003	-0.121	-4.315*	3.064	11.188**	0.020
	(0.077)	(0.110)	(2.428)	(2.637)	(5.170)	(0.067)
Ratio of wife's years of education to husband's	0.008	-0.034**	0.604	0.867***	1.269**	0.010
	(0.007)	(0.014)	(0.398)	(0.241)	(0.493)	(0.008)
Husband is employed (=1)	0.105**	0.180***	1.596	-0.196	5.633**	-0.045
	(0.043)	(0.064)	(1.648)	(1.739)	(2.820)	(0.044)
Household size	-0.014***	-0.005	-0.096	-0.345***	-0.114	-0.003
	(0.004)	(0.006)	(0.118)	(0.127)	(0.220)	(0.004)
Number of children in household	0.076***	0.009	0.003	-0.310	-0.376	-0.020**
	(0.009)	(0.016)	(0.302)	(0.311)	(0.556)	(0.008)
Log per-capita expenditure	-0.007	0.236***	2.125***	0.927**	1.585*	0.048***
	(0.015)	(0.028)	(0.529)	(0.453)	(0.870)	(0.015)
Live with wife's parents (=1)	-0.004	0.074*	2.115**	-1.821*	1.712	0.046*
	(0.024)	(0.041)	(0.954)	(0.929)	(1.846)	(0.026)
Live with husband's parents (=1)	-0.024	-0.005	0.351	-4.619***	-10.817***	0.033
	(0.026)	(0.046)	(1.099)	(0.876)	(1.792)	(0.024)
Ambilocal kinship norms (=1)	0.016	0.088	3.177**	-0.305	-2.416*	0.015
	(0.022)	(0.067)	(1.590)	(0.650)	(1.291)	(0.027)
Patrilocal kinship norms (=1)	-0.019	-0.111**	-1.578*	-2.561***	-8.296***	0.043
	(0.026)	(0.054)	(0.939)	(0.759)	(1.512)	(0.027)
Urban (=1)	-0.004	0.036	-1.397	-0.674	-0.564	-0.111***
	(0.020)	(0.050)	(1.127)	(0.559)	(1.099)	(0.020)
Java	0.041**	0.258***	5.688***	0.546	-1.764	-0.017
	(0.020)	(0.047)	(1.032)	(0.618)	(1.324)	(0.025)

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B12: *OLS Estimation of the Impact of Religiosity (Religious Practice) on Indirect Proxy of Women's Autonomy (IFLS 2007)*

	Currently use birth control	Number of *arisan* groups joined	Number of *arisan meetings* attended last year	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
Religiosity (religious practice)	-0.001	0.023	0.494	-0.401	0.790	-0.006
	(0.010)	(0.020)	(0.351)	(0.304)	(0.600)	(0.012)
Wife's age	0.049***	0.031***	0.792**	-0.006	1.309**	0.046***
	(0.008)	(0.012)	(0.307)	(0.290)	(0.602)	(0.008)
Wife age^2	-0.001***	-0.000	-0.007	0.001	-0.015*	-0.000***
	(0.000)	(0.000)	(0.005)	(0.004)	(0.008)	(0.000)
Religion is Islam (=1)	0.036	0.090	2.411***	0.458	4.326**	-0.140***
	(0.043)	(0.064)	(0.857)	(1.012)	(2.108)	(0.033)
Wife's years of education	-0.004	0.042***	0.338***	-0.110	-0.269**	0.001
	(0.003)	(0.005)	(0.107)	(0.077)	(0.126)	(0.002)
Ratio of wife's age to husband's	0.000	-0.133	-4.620*	3.392	13.349**	0.003
	(0.080)	(0.107)	(2.525)	(2.747)	(5.407)	(0.068)
Ratio of wife's years of education to husband's	0.007	-0.039**	0.600	0.810***	0.924*	0.010
	(0.008)	(0.015)	(0.432)	(0.242)	(0.499)	(0.009)
Husband is employed (=1)	0.112**	0.193***	1.838	0.292	5.871**	-0.048
	(0.046)	(0.066)	(1.679)	(1.731)	(2.880)	(0.046)
Household size	-0.016***	-0.009	-0.136	-0.402***	-0.154	-0.005
	(0.004)	(0.006)	(0.128)	(0.129)	(0.226)	(0.004)
Number of children in household	0.077***	0.014	0.058	-0.371	-0.423	-0.017*
	(0.010)	(0.016)	(0.314)	(0.317)	(0.573)	(0.009)
Log per-capita expenditure	-0.005	0.240***	2.329***	0.835*	1.169	0.046***
	(0.016)	(0.029)	(0.553)	(0.461)	(0.889)	(0.015)
Live with wife's parents (=1)	0.003	0.116***	2.375**	-1.807**	1.656	0.049*
	(0.026)	(0.044)	(1.028)	(0.885)	(1.750)	(0.027)
Live with husband's parents (=1)	-0.013	0.015	0.456	-4.632***	-10.580***	0.044*
	(0.026)	(0.047)	(1.149)	(0.847)	(1.813)	(0.024)
Ambilocal kinship norms (=1)	0.017	0.099	3.449**	-0.390	-2.490*	0.017
	(0.023)	(0.067)	(1.632)	(0.685)	(1.352)	(0.027)
Patrilocal kinship norms (=1)	-0.018	-0.089	-1.380	-2.847***	-8.933***	0.046
	(0.027)	(0.055)	(0.995)	(0.774)	(1.564)	(0.028)
Urban (=1)	-0.001	0.029	-1.498	-0.604	-0.228	-0.109***
	(0.021)	(0.051)	(1.160)	(0.577)	(1.130)	(0.020)
Java	0.041*	0.262***	5.863***	0.198	-2.529*	-0.016
	(0.021)	(0.048)	(1.095)	(0.662)	(1.391)	(0.026)

Standard errors, clustered at village level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B13: *OLS Estimation of the Impact of Religiosity (Self-Assessment) on Indirect Proxy of Women's Autonomy (IFLS 2014)*

	Currently use birth control	Number of *arisan* groups joined	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
Religiosity (self-assessment)	0.003	-0.014	-0.263	-0.970	0.013*
	(0.007)	(0.019)	(0.346)	(0.704)	(0.008)
Wife's age	0.026***	0.002	1.143***	1.696**	0.061***
	(0.007)	(0.019)	(0.341)	(0.681)	(0.007)
Wife age^2	-0.000***	0.000	-0.014***	-0.019*	-0.001***
	(0.000)	(0.000)	(0.005)	(0.010)	(0.000)
Wife's years of education	-0.007***	0.045***	0.036	-0.067	0.007***
	(0.002)	(0.006)	(0.098)	(0.180)	(0.002)
Ratio of wife's age to husband's	-0.185***	-0.287*	3.020	22.140***	-0.010
	(0.063)	(0.157)	(3.037)	(5.875)	(0.061)
Ratio of wife's years of education to husband's	0.006	-0.051***	0.980***	1.165*	0.001
	(0.008)	(0.019)	(0.346)	(0.644)	(0.008)
Husband is employed (=1)	-0.005	0.135	-5.010**	-3.495	-0.010
	(0.043)	(0.131)	(2.213)	(4.353)	(0.041)
Household size	-0.007**	0.005	-0.319**	0.236	0.006**
	(0.003)	(0.007)	(0.147)	(0.298)	(0.003)
Number of children in household	0.107***	0.041**	-0.733*	-0.676	-0.040***
	(0.009)	(0.020)	(0.405)	(0.737)	(0.009)
Log per-capita expenditure	-0.037***	0.186***	1.727***	1.831	0.046***
	(0.013)	(0.044)	(0.626)	(1.216)	(0.012)
Live with wife's parents (=1)	-0.035	0.039	-1.320	6.166**	0.002
	(0.022)	(0.065)	(1.151)	(2.577)	(0.022)
Live with husband's parents (=1)	-0.074***	0.068	-9.217***	-15.497***	0.010
	(0.022)	(0.078)	(1.130)	(2.202)	(0.024)
Ambilocal kinship norms (=1)	0.027	0.108	-1.106	-6.791***	0.031
	(0.020)	(0.069)	(0.905)	(1.892)	(0.023)
Patrilocal kinship norms (=1)	0.004	-0.023	-5.585***	-14.609***	0.027
	(0.020)	(0.070)	(1.002)	(1.967)	(0.026)
Urban (=1)	-0.036**	-0.179***	-0.377	-0.130	-0.053***
	(0.017)	(0.056)	(0.838)	(1.664)	(0.019)
Java	0.037**	0.096	0.360	0.186	-0.014
	(0.016)	(0.065)	(0.857)	(1.770)	(0.021)

Standard errors, clustered at village level, in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B14: *OLS Estimation of the Impact of Religiosity (Religious Practice) on Indirect Proxy of Women's Autonomy (IFLS 2014)*

	Currently use birth control	Number of *arisan* groups joined	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
Religiosity (religious practice)	-0.011	0.021	-0.136	0.605	0.005
	(0.009)	(0.028)	(0.368)	(0.734)	(0.012)
Wife's age	0.029***	-0.003	1.082***	1.814***	0.058***
	(0.007)	(0.019)	(0.344)	(0.697)	(0.007)
Wife age^2	-0.001***	0.000	-0.013**	-0.021**	-0.001***
	(0.000)	(0.000)	(0.005)	(0.010)	(0.000)
Wife's years of education	-0.007***	0.045***	0.089	-0.030	0.007***
	(0.002)	(0.006)	(0.103)	(0.188)	(0.002)
Ratio of wife's age to husband's	-0.217***	-0.230	2.922	23.318***	-0.001
	(0.065)	(0.159)	(3.084)	(6.114)	(0.062)
Ratio of wife's years of education to husband's	0.006	-0.044**	0.835**	1.172*	-0.001
	(0.008)	(0.019)	(0.350)	(0.635)	(0.008)
Husband is employed (=1)	-0.004	0.114	-5.324**	-4.584	-0.004
	(0.046)	(0.136)	(2.254)	(4.566)	(0.043)
Household size	-0.007**	0.005	-0.365**	0.186	0.007**
	(0.003)	(0.007)	(0.148)	(0.298)	(0.003)
Number of children in household	0.110***	0.041*	-0.592	-0.470	-0.040***
	(0.009)	(0.021)	(0.407)	(0.748)	(0.009)
Log per-capita expenditure	-0.033**	0.185***	1.695***	1.948	0.040***
	(0.014)	(0.044)	(0.636)	(1.238)	(0.013)
Live with wife's parents (=1)	-0.027	0.036	-0.754	6.510**	-0.002
	(0.023)	(0.067)	(1.162)	(2.616)	(0.023)
Live with husband's parents (=1)	-0.064***	0.074	-9.186***	-14.849***	0.008
	(0.023)	(0.079)	(1.157)	(2.238)	(0.024)
Ambilocal kinship norms (=1)	0.033	0.097	-0.988	-6.535***	0.035
	(0.021)	(0.071)	(0.953)	(1.974)	(0.023)
Patrilocal kinship norms (=1)	0.005	-0.027	-5.512***	-14.484***	0.027
	(0.021)	(0.071)	(1.025)	(1.984)	(0.026)
Urban (=1)	-0.030*	-0.175***	-0.175	-0.099	-0.052***
	(0.017)	(0.058)	(0.863)	(1.684)	(0.019)
Java	0.034**	0.086	0.589	0.514	-0.016
	(0.017)	(0.067)	(0.892)	(1.776)	(0.021)

Standard errors, clustered at village level, in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B15: *Fixed-effect Estimation of the Impact of Religiosity (Self-Assessment) on Indirect Proxy of Women's Autonomy*

	Currently use birth control	Number of *arisan* groups joined	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
Religiosity (self-assessment)	-0.015*	0.033	0.424	0.080	-0.001
	(0.008)	(0.022)	(0.360)	(0.721)	(0.008)
Wife's age	0.034***	0.173***	-0.383	0.042	0.075***
	(0.009)	(0.024)	(0.411)	(0.806)	(0.009)
Wife age^2	-0.001***	-0.001***	0.006	-0.007	-0.001***
	(0.000)	(0.000)	(0.006)	(0.011)	(0.000)
Wife's years of education	0.004	0.001	0.645***	0.373	0.003
	(0.005)	(0.012)	(0.242)	(0.451)	(0.005)
Ratio of wife's years of education to husband's	-0.012	-0.005	-0.909*	-0.958	0.002
	(0.013)	(0.031)	(0.504)	(0.975)	(0.012)
Household size	-0.002	-0.014	-0.607**	-0.070	0.010*
	(0.006)	(0.013)	(0.249)	(0.609)	(0.006)
Number of children in household	0.101***	0.056**	0.205	-0.392	-0.053***
	(0.011)	(0.026)	(0.496)	(0.926)	(0.011)
Log per-capita expenditure	-0.008	0.168***	-0.521	-1.716	0.028*
	(0.017)	(0.045)	(0.793)	(1.400)	(0.016)
Live with wife's parents (=1)	0.028	0.054	-3.308**	-5.299	0.067**
	(0.034)	(0.080)	(1.539)	(3.276)	(0.030)
Live with husband's parents (=1)	-0.077**	0.047	-3.646**	2.929	0.016
	(0.035)	(0.083)	(1.589)	(3.853)	(0.035)
Urban (=1)	0.078***	-0.089	0.845	1.468	0.021
	(0.028)	(0.064)	(1.307)	(2.837)	(0.027)

Standard errors, clustered at village level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Control variable estimates that are not statistically significant are not presented.
These control variables are: religion is Islam, ratio of wife's age to husband's, husband is employed, and Java.
The estimations also include, although not presented, age fixed-effect and birth month by province fixed effect.

Table B16: *Fixed-effect Estimation of the Impact of Religiosity (Religious Practice) on Indirect Proxy of Women's Autonomy*

	Currently use birth control	Number of *arisan* groups joined	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
Religiosity (religious practice)	-0.016	0.006	-0.857*	1.057	0.001
	(0.010)	(0.030)	(0.478)	(0.854)	(0.011)
Wife's age	0.033***	0.175***	-0.362	0.676	0.075***
	(0.010)	(0.026)	(0.425)	(0.849)	(0.010)
Wife age^2	-0.001***	-0.001***	0.006	-0.015	-0.001***
	(0.000)	(0.000)	(0.006)	(0.011)	(0.000)
Wife's years of education	0.005	0.003	0.651***	0.319	0.005
	(0.005)	(0.012)	(0.250)	(0.451)	(0.005)
Ratio of wife's years of education to husband's	-0.014	-0.010	-0.990*	-0.246	-0.003
	(0.013)	(0.033)	(0.563)	(0.974)	(0.012)
Husband is employed (=1)	0.106**	0.159	-2.153	-2.875	-0.001
	(0.049)	(0.139)	(2.418)	(5.441)	(0.054)
Household size	0.004	-0.011	-0.690**	-0.070	0.016***
	(0.006)	(0.014)	(0.275)	(0.604)	(0.006)
Number of children in household	0.099***	0.058**	-0.042	-0.892	-0.055***
	(0.011)	(0.027)	(0.511)	(0.968)	(0.011)
Log per-capita expenditure	0.001	0.165***	-0.783	-2.314	0.029*
	(0.018)	(0.048)	(0.830)	(1.479)	(0.016)
Live with wife's parents (=1)	0.029	0.068	-3.567**	-5.402*	0.068**
	(0.036)	(0.088)	(1.624)	(3.266)	(0.032)
Live with husband's parents (=1)	-0.085**	0.038	-3.807**	4.799	0.008
	(0.036)	(0.086)	(1.632)	(3.870)	(0.035)
Urban (=1)	0.079***	-0.094	0.926	1.628	0.021
	(0.028)	(0.062)	(1.178)	(2.688)	(0.028)

Standard errors, clustered at village level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Control variable estimates that are not statistically significant are not presented.
These control variables are: religion is Islam, ratio of wife's age to husband's, & Java.
The estimations also include, although not presented, age fixed-effect and birth month by province fixed effect.

Table B17: *IV Estimation of the Impact of Religiosity (Self-Assessment) on Indirect Proxy of Women's Autonomy (IFLS 2007)*

	Currently use birth control	Number of *arisan* groups joined	Number of *arisan meetings* attended last year	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
Religiosity (self-assessment)	-0.041 (0.061)	0.240 (0.157)	4.804 (3.370)	-1.387 (1.799)	-8.800** (3.557)	0.122* (0.072)
Wife's age	0.049*** (0.008)	0.027** (0.013)	0.688** (0.331)	-0.001 (0.283)	1.194** (0.583)	0.046*** (0.008)
Wife age^2	-0.001*** (0.000)	-0.000 (0.000)	-0.007 (0.005)	0.001 (0.004)	-0.012 (0.008)	-0.001*** (0.000)
Religion is Islam (=1)	0.001 (0.052)	0.165* (0.093)	4.083** (1.702)	0.342 (1.163)	2.180 (2.455)	-0.083* (0.042)
Wife's years of education	-0.004 (0.003)	0.041*** (0.005)	0.324*** (0.109)	-0.135* (0.076)	-0.222* (0.126)	0.001 (0.002)
Ratio of wife's age to husband's	0.014 (0.078)	-0.083 (0.117)	-3.689 (2.573)	2.565 (2.688)	11.807** (5.318)	0.036 (0.072)
Ratio of wife's years of education to husband's	0.007 (0.008)	-0.033** (0.015)	0.654 (0.417)	0.831*** (0.241)	1.093** (0.509)	0.009 (0.008)
Husband is employed (=1)	0.107** (0.044)	0.169** (0.069)	1.503 (1.733)	-0.291 (1.642)	3.954 (2.947)	-0.048 (0.047)
Household size	-0.015*** (0.004)	-0.003 (0.007)	-0.052 (0.141)	-0.371*** (0.138)	-0.157 (0.264)	-0.001 (0.004)
Number of children in household	0.078*** (0.010)	0.013 (0.018)	0.056 (0.333)	-0.362 (0.320)	-0.673 (0.600)	-0.023** (0.009)
Log per-capita expenditure	-0.005 (0.016)	0.228*** (0.030)	2.037*** (0.571)	1.046** (0.475)	2.240** (0.921)	0.041** (0.016)
Live with wife's parents (=1)	-0.003 (0.025)	0.105** (0.045)	2.564** (1.013)	-1.647* (0.954)	1.116 (1.937)	0.053* (0.028)
Live with husband's parents (=1)	-0.030 (0.027)	0.003 (0.049)	0.290 (1.148)	-4.514*** (0.899)	-10.279*** (1.758)	0.036 (0.025)
Ambilocal kinship norms (=1)	0.015 (0.024)	0.071 (0.072)	3.046* (1.714)	-0.262 (0.678)	-1.800 (1.403)	-0.001 (0.028)
Patrilocal kinship norms (=1)	-0.010 (0.028)	-0.118** (0.056)	-1.814* (1.015)	-2.439*** (0.785)	-7.419*** (1.579)	0.027 (0.028)
Urban (=1)	-0.011 (0.021)	0.048 (0.053)	-1.193 (1.192)	-0.628 (0.560)	-0.779 (1.154)	-0.093*** (0.022)
Java	0.055** (0.024)	0.226*** (0.058)	4.900*** (1.299)	0.835 (0.711)	-0.012 (1.662)	-0.040 (0.028)

Standard errors, clustered at village level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variables are: community-level self-assessed religiosity, community-level religious practice, and more than 75 percent village population participation in religious practice.

Table B18: *IV Estimation of the Impact of Religiosity (Religious Practice) on Indirect Proxy of Women's Autonomy (IFLS 2007)*

	Currently use birth control	Number of *arisan* groups joined	Number of *arisan meetings* attended last year	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
Religiosity (religious practice)	-0.131** (0.052)	0.131 (0.130)	0.890 (2.462)	-1.682 (1.637)	-7.570** (3.394)	0.087 (0.061)
Wife's age	0.050*** (0.008)	0.025* (0.013)	0.735** (0.332)	-0.056 (0.285)	1.682*** (0.614)	0.045*** (0.008)
Wife age^2	-0.001*** (0.000)	-0.000 (0.000)	-0.007 (0.005)	0.002 (0.004)	-0.019** (0.008)	-0.000*** (0.000)
Religion is Islam (=1)	-0.013 (0.051)	0.108 (0.077)	2.522** (1.090)	0.469 (1.040)	4.393** (1.984)	-0.108*** (0.034)
Wife's years of education	-0.002 (0.003)	0.040*** (0.006)	0.325*** (0.118)	-0.107 (0.084)	-0.106 (0.148)	-0.000 (0.003)
Ratio of wife's age to husband's	-0.025 (0.081)	-0.084 (0.117)	-4.365 (2.793)	2.602 (2.815)	11.490** (5.556)	0.032 (0.074)
Ratio of wife's years of education to husband's	0.007 (0.008)	-0.039*** (0.015)	0.602 (0.438)	0.768*** (0.242)	0.692 (0.493)	0.009 (0.009)
Husband is employed (=1)	0.121** (0.047)	0.181*** (0.069)	1.809 (1.764)	0.261 (1.609)	5.623* (2.932)	-0.054 (0.047)
Household size	-0.015*** (0.004)	-0.009 (0.007)	-0.134 (0.139)	-0.437*** (0.136)	-0.093 (0.255)	-0.004 (0.004)
Number of children in household	0.077*** (0.010)	0.019 (0.018)	0.068 (0.346)	-0.416 (0.324)	-0.766 (0.589)	-0.018* (0.009)
Log per-capita expenditure	-0.001 (0.016)	0.243*** (0.030)	2.471*** (0.573)	0.911* (0.471)	1.565* (0.927)	0.044*** (0.016)
Live with wife's parents (=1)	-0.004 (0.028)	0.146*** (0.045)	2.682** (1.072)	-1.608* (0.894)	1.367 (1.827)	0.060** (0.028)
Live with husband's parents (=1)	-0.015 (0.027)	0.022 (0.048)	0.371 (1.183)	-4.510*** (0.868)	-9.861*** (1.889)	0.048* (0.024)
Ambilocal kinship norms (=1)	0.015 (0.025)	0.098 (0.070)	3.674** (1.690)	-0.410 (0.696)	-2.076 (1.391)	0.009 (0.027)
Patrilocal kinship norms (=1)	-0.000 (0.029)	-0.086 (0.056)	-1.304 (1.014)	-2.702*** (0.803)	-7.801*** (1.671)	0.030 (0.029)
Urban (=1)	-0.016 (0.022)	0.030 (0.052)	-1.620 (1.172)	-0.546 (0.550)	-0.556 (1.128)	-0.093*** (0.021)
Java	0.075*** (0.025)	0.248*** (0.053)	5.749*** (1.176)	0.586 (0.818)	-0.784 (1.738)	-0.040 (0.029)

Standard errors, clustered at village level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variables are: community-level self-assessed religiosity, community-level religious practice, and more than 75 percent village population participation in religious practice.

Table B19: *IV Estimation of the Impact of Religiosity (Self-Assessment) on Indirect Proxy of Women's Autonomy (IFLS 2014)*

	Currently use birth control	Number of *arisan* groups joined	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
Religiosity (self-assessment)	0.119**	0.366**	-9.004***	-16.446***	0.054
	(0.051)	(0.172)	(2.870)	(4.738)	(0.075)
Wife's age	0.023**	-0.025	1.445***	2.609***	0.056***
	(0.009)	(0.024)	(0.439)	(0.846)	(0.009)
Wife age^2	-0.000***	0.000	-0.016***	-0.029**	-0.001***
	(0.000)	(0.000)	(0.006)	(0.012)	(0.000)
Religion is Islam (=1)	0.129***	0.340***	-1.433	-0.203	-0.115*
	(0.044)	(0.125)	(1.716)	(3.293)	(0.060)
Wife's years of education	-0.003	0.052***	-0.078	-0.241	0.008***
	(0.002)	(0.007)	(0.130)	(0.218)	(0.003)
Ratio of wife's age to husband's	-0.149**	-0.154	-0.164	14.116*	-0.025
	(0.076)	(0.204)	(3.951)	(7.303)	(0.071)
Ratio of wife's years of education to husband's	0.010	-0.060***	0.520	0.250	0.001
	(0.008)	(0.023)	(0.365)	(0.646)	(0.008)
Husband is employed (=1)	0.067	0.031	-5.255**	-5.094	-0.014
	(0.053)	(0.186)	(2.565)	(5.968)	(0.046)
Household size	-0.009**	-0.002	-0.412**	0.157	0.004
	(0.003)	(0.009)	(0.171)	(0.344)	(0.003)
Number of children in household	0.097***	0.061**	-0.971**	-1.486*	-0.039***
	(0.009)	(0.025)	(0.457)	(0.815)	(0.010)
Log per-capita expenditure	-0.018	0.227***	1.217	2.346	0.033**
	(0.016)	(0.053)	(0.787)	(1.487)	(0.014)
Live with wife's parents (=1)	-0.033	0.030	-0.180	6.596**	-0.018
	(0.026)	(0.083)	(1.447)	(3.106)	(0.026)
Live with husband's parents (=1)	-0.081***	0.102	-8.649***	-15.251***	-0.012
	(0.025)	(0.093)	(1.387)	(2.689)	(0.027)
Ambilocal kinship norms (=1)	0.021	0.068	-0.546	-5.590**	0.010
	(0.023)	(0.089)	(1.123)	(2.342)	(0.028)
Patrilocal kinship norms (=1)	-0.016	-0.147	-5.037***	-15.013***	0.021
	(0.025)	(0.096)	(1.262)	(2.203)	(0.032)
Urban (=1)	-0.018	-0.127	-1.370	-0.909	-0.049**
	(0.020)	(0.078)	(1.051)	(1.936)	(0.023)

Standard errors, clustered at village level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variables are: community-level self-assessed religiosity, community-level religious practice, and more than 75 percent village population participation in religious practice.
Control variable estimates that are not statistically significant are not presented (Java).

Table B20: *IV Estimation of the Impact of Religiosity (Religious Practice) on Indirect Proxy of Women's Autonomy (IFLS 2014)*

	Currently use birth control	Number of *arisan* groups joined	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
Religiosity (religious practice)	0.055 (0.039)	-0.031 (0.129)	-6.566*** (2.256)	-10.218*** (3.805)	0.017 (0.063)
Wife's age	0.033*** (0.008)	-0.005 (0.023)	1.005*** (0.388)	1.522* (0.785)	0.053*** (0.008)
Wife age^2	-0.001*** (0.000)	0.000 (0.000)	-0.009 (0.006)	-0.014 (0.011)	-0.001*** (0.000)
Religion is Islam (=1)	0.085** (0.041)	0.245** (0.109)	1.810 (1.552)	7.766*** (2.873)	-0.131*** (0.045)
Wife's years of education	-0.007** (0.003)	0.054*** (0.008)	0.241* (0.132)	0.258 (0.225)	0.007*** (0.002)
Ratio of wife's age to husband's	-0.180** (0.077)	-0.224 (0.195)	-0.527 (3.941)	16.832** (7.273)	-0.027 (0.075)
Ratio of wife's years of education to husband's	0.012 (0.008)	-0.052** (0.022)	0.392 (0.339)	0.473 (0.599)	-0.002 (0.008)
Household size	-0.009** (0.003)	-0.001 (0.008)	-0.444*** (0.156)	0.123 (0.317)	0.005 (0.003)
Number of children in household	0.094*** (0.010)	0.051** (0.024)	-0.456 (0.436)	-0.578 (0.828)	-0.040*** (0.010)
Log per-capita expenditure	-0.017 (0.016)	0.227*** (0.053)	1.571** (0.733)	3.381** (1.428)	0.028* (0.015)
Live with wife's parents (=1)	-0.020 (0.026)	0.048 (0.079)	-0.034 (1.313)	5.871** (2.926)	-0.021 (0.026)
Live with husband's parents (=1)	-0.074*** (0.026)	0.096 (0.091)	-8.180*** (1.372)	-13.073*** (2.568)	-0.014 (0.029)
Ambilocal kinship norms (=1)	0.032 (0.023)	0.107 (0.085)	-0.835 (1.152)	-5.820** (2.410)	0.017 (0.028)
Patrilocal kinship norms (=1)	-0.020 (0.026)	-0.058 (0.089)	-4.550*** (1.270)	-13.325*** (2.560)	0.024 (0.032)
Urban (=1)	-0.023 (0.020)	-0.197*** (0.069)	-0.373 (1.028)	0.283 (1.925)	-0.054** (0.022)

Standard errors, clustered at village level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variables are: community-level self-assessed religiosity, community-level religious practice, and more than 75 percent village population participation in religious practice.
Control variable estimates that are not statistically significant are not presented.
These control variables are: husband is employed and Java.

Table B21: *First Stage Estimation Results (IFLS 2007)*

	All observations		Only for Muslims	
	Religiosity (self-assessment)	Religiosity (religious practice)	Religiosity (self-assessment)	Religiosity (religious practice)
Community religiosity (self-assessment)	0.394***	0.139***	0.358***	0.129*
	(0.070)	(0.067)	(0.077)	(0.071)
Community religiosity (religious practice))	0.027	0.346**	0.075	0.318***
	(0.047)	(0.060)	(0.051)	(0.061)
More than 75 percent of village population participated in religious activities (=1)	0.106***	0.105***	0.099**	0.091**
	(0.040)	(0.039)	(0.041)	(0.041)
Observations	4284	4046	3889	3646
Adjusted R^2	0.079	0.132	0.079	0.132
F-stats	16.65	17.25	17.81	15.08

Standard errors, clustered at village level, in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B22: *First Stage Estimation Results (IFLS 2014)*

	All observations		Only for Muslims	
	Religiosity (self-assessment)	Religiosity (religious practice)	Religiosity (self-assessment)	Religiosity (religious practice)
Community religiosity (self-assessment)	0.375***	0.125	0.324***	0.161*
	(0.072)	(0.081)	(0.085)	(0.090)
Community religiosity (praying behaviors/ praying frequency-only for Muslims)	0.180***	0.402***	0.232***	0.378***
	(0.042)	(0.063)	(0.046)	(0.062)
More than 75 percent of village population participated in religious activities (=1)	0.018	0.0878**	-0.009	0.061
	(0.041)	(0.040)	(0.043)	(0.040)
Observations	4042	3874	3655	3486
Adjusted R^2	0.090	0.157	0.075	0.162
F-stats	19.79	22.87	19.47	23.00

Standard errors, clustered at village level, in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B23: *OLS Estimation of the Impact of Religiosity on Women's Decision-making Power*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
IFLS 2007						
Religiosity	-0.023	0.001	-0.007	-0.007	-0.016*	0.007
(self-assessment)	(0.046)	(0.012)	(0.030)	(0.016)	(0.009)	(0.006)
Observations	5270	4977	5270	5270	5270	4337
Adjusted R^2	0.031	0.008	0.023	0.017	0.025	0.008
Religiosity	-0.095*	-0.014	-0.009	-0.053***	-0.023**	0.005
(religious practice)	(0.051)	(0.011)	(0.037)	(0.016)	(0.010)	(0.009)
Observations	5013	4746	5013	5013	5013	4124
Adjusted R^2	0.029	0.008	0.022	0.018	0.027	0.008
IFLS 2014						
Religiosity	-0.191***	-0.040**	-0.095***	-0.041*	-0.008	-0.010
(self-assessment)	(0.058)	(0.016)	(0.026)	(0.023)	(0.012)	(0.008)
Observations	6393	6005	6393	6393	6393	5800
Adjusted R^2	0.056	0.022	0.035	0.042	0.039	0.014
Religiosity	-0.052	-0.032**	-0.017	0.040	-0.022*	-0.026***
(religious practice)	(0.063)	(0.016)	(0.031)	(0.026)	(0.012)	(0.008)
Observations	6127	5763	6127	6127	6127	5556
Adjusted R^2	0.055	0.022	0.033	0.042	0.041	0.017

Standard errors, clustered at community level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Control variables: wife's age, wife's age^2, wife's years of education, religion is Islam, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table B24: *Fixed-effect Estimation of the Impact of Religiosity on Women's Decision-making Power*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
PANEL estimations						
Religiosity	-0.072	-0.020	-0.018	-0.014	-0.019*	0.000
(self-assessment)	(0.052)	(0.016)	(0.030)	(0.021)	(0.011)	(0.008)
Observations	12394	11902	12394	12394	12394	10895
Adjusted R^2	0.127	0.133	0.105	0.057	0.034	0.022
F-stat	39.049	39.464	28.623	17.934	9.383	5.614
Religiosity	0.004	0.012	0.021	0.005	-0.021	-0.007
(religious practrice)	(0.063)	(0.017)	(0.035)	(0.026)	(0.014)	(0.010)
Observations	11895	11436	11895	11895	11895	10458
Adjusted R^2	0.127	0.131	0.107	0.056	0.033	0.020
F-stat	37.740	36.301	28.544	15.830	9.595	4.772

Standard errors, clustered at community level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Control variables: wife's age, wife's age^2, wife's years of education, religion is Islam, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table B25: *IV Estimation of the Impact of Religiosity on Women's Decision-making Power*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
IFLS 2007						
Religiosity (self-assessment)	-0.212	-0.059	-0.034	-0.041	-0.076	0.005
	(0.320)	(0.079)	(0.227)	(0.090)	(0.058)	(0.056)
Observations	5116	4834	5116	5116	5116	4212
Adjusted R^2	0.027	0.000	0.025	0.015	0.015	0.008
First stage F-stat	26.38	21.73	26.38	26.38	26.38	20.67
$\tilde{\chi}^2$ *P-val* *(Overidentification test)*	0.013	0.241	0.024	0.017	0.970	0.289
Religiosity (religious practice)	-0.821***	-0.115*	-0.395**	-0.218***	-0.040	-0.063
	(0.301)	(0.066)	(0.200)	(0.073)	(0.042)	(0.042)
Observations	4868	4612	4868	4868	4868	4006
Adjusted R^2	-0.020	-0.009	-0.007	-0.007	0.027	-0.013
First stage F-stat	30.02	29.70	30.02	30.02	30.02	28.48
$\tilde{\chi}^2$ *P-val* *(Overidentification test)*	0.156	0.698	0.120	0.229	0.636	0.419
IFLS 2014						
Religiosity (self-assessment)	-1.671***	-0.480***	-0.902***	-0.152	-0.114	-0.081*
	(0.441)	(0.112)	(0.237)	(0.141)	(0.077)	(0.043)
Observations	5139	4880	5139	5139	5139	4662
Adjusted R^2	-0.072	-0.130	-0.123	0.035	0.024	-0.004
First stage F-stat	19.14	18.57	19.14	19.14	19.14	18.08
$\tilde{\chi}^2$ *P-val* *(Overidentification test)*	0.850	0.703	0.966	0.468	0.422	0.199
Religiosity (religious practice)	-1.124***	-0.315***	-0.507***	-0.168	-0.076	-0.093***
	(0.303)	(0.076)	(0.162)	(0.103)	(0.055)	(0.033)
Observations	4950	4711	4950	4950	4950	4488
Adjusted R^2	-0.002	-0.030	-0.013	0.028	0.036	0.004
First stage F-stat	25.57	24.30	25.57	25.57	25.57	20.81
$\tilde{\chi}^2$ *P-val* *(Overidentification test)*	0.284	0.364	0.056	0.715	0.206	0.610

Standard errors, clustered at community level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variables are: community-level self-assessed religiosity, community-level religious practice, and more than 75 percent village population participation in religious practice.
Control variables: wife's age, wife's age^2, wife's years of education, religion is Islam, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure,
live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table B26: *OLS Estimation of the Impact of Religiosity on Indirect Proxy of Women's Autonomy*

	Currently use birth control	Number of *arisan* groups joined	Number of *arisan meetings* attended last year	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
IFLS 2007						
Religiosity (self-assessment)	0.010	0.026*	0.875***	-0.391	-0.664	0.011
	(0.008)	(0.015)	(0.285)	(0.264)	(0.538)	(0.009)
Observations	4414	5271	5271	5219	3855	5271
Adjusted R^2	0.061	0.158	0.081	0.033	0.056	0.087
Religiosity (religious practice)	-0.001	0.047**	0.872***	-0.002	1.034**	-0.001
	(0.010)	(0.018)	(0.312)	(0.283)	(0.514)	(0.010)
Observations	4167	5014	5014	4969	3717	5014
Adjusted R^2	0.060	0.161	0.082	0.036	0.060	0.086
IFLS 2014						
Religiosity (self-assessment)	0.003	-0.005	N/A	-0.347	-0.803	0.011
	(0.007)	(0.017)		(0.324)	(0.644)	(0.007)
Observations	5233	3296		6369	4666	6393
Adjusted R^2	0.080	0.074		0.062	0.079	0.076
Religiosity (religious practice)	-0.011	0.039	N/A	-0.256	-0.008	0.002
	(0.009)	(0.023)		(0.324)	(0.608)	(0.010)
Observations	4990	3185		6105	4527	6127
Adjusted R^2	0.081	0.073		0.063	0.081	0.071

Standard errors, clustered at community level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Control variables: wife's age, wife's age^2, wife's years of education, religion is Islam, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table B27: *Fixed-effect Estimation of the Impact of Religiosity on Indirect Proxy of Women's Autonomy*

	Currently use birth control	Number of *arisan* groups joined	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
Religiosity (self-assessment)	-0.015*	0.025	0.181	-0.031	0.002
	(0.008)	(0.019)	(0.310)	(0.582)	(0.006)
Observations	10408	9798	12337	9401	12395
Adjusted R^2	0.068	0.326	0.012	0.009	0.063
F-stat	18.818	74.859	4.021	2.148	20.755
Religiosity (religious practice)	-0.016	0.018	-0.544	0.896	0.005
	(0.010)	(0.025)	(0.405)	(0.642)	(0.008)
Observations	9938	9387	11844	9118	11896
Adjusted R^2	0.070	0.325	0.015	0.010	0.063
F-stat	18.875	70.328	4.137	2.207	18.759

Standard errors, clustered at community level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Control variables: wife's age, wife's age^2, wife's years of education, religion is Islam, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table B28: *IV Estimation of the Impact of Religiosity on Indirect Proxy of Women's Autonomy*

	Currently use birth control	Number of *arisan* groups joined	Number of *arisan meetings* attended last year	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
IFLS 2007						
Religiosity	-0.040	0.251*	5.149*	-1.451	-6.334**	0.092
(self-assessment)	(0.061)	(0.138)	(3.009)	(1.495)	(2.680)	(0.064)
Observations	4282	5117	5117	5068	3745	5117
Adjusted R^2	0.053	0.112	0.039	0.030	0.021	0.067
First stage F-stat	16.67	26.41	26.41	26.95	18.07	26.41
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.012	0.607	0.605	0.947	0.740	0.162
Religiosity	-0.131**	0.173	2.130	-0.953	-3.153	0.051
(religious practice)	(0.052)	(0.108)	(2.079)	(1.281)	(2.563)	(0.052)
Observations	4044	4869	4869	4827	3609	4869
Adjusted R^2	0.022	0.150	0.078	0.034	0.042	0.079
First stage F-stat	17.16	29.99	29.99	30.60	36.07	29.99
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.207	0.804	0.370	0.798	0.166	0.100
IFLS 2014						
Religiosity	0.119**	0.304**	N/A	-7.445***	-13.692***	0.058
(self-assessment)	(0.051)	(0.144)		(2.330)	(4.086)	(0.063)
Observations	4038	2697		5124	3923	5139
Adjusted R^2	0.019	0.012		-0.023	-0.027	0.061
First stage F-stat	19.87	23.93		32.54	31.62	31.88
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.104	0.189		0.171	0.788	0.122
Religiosity	0.055	-0.016	N/A	-4.726***	-7.424**	0.001
(religious practice)	(0.039)	(0.106)		(1.800)	(2.961)	(0.051)
Observations	3870	2616		4937	3819	4950
Adjusted R^2	0.059	0.080		0.038	0.050	0.064
First stage F-stat	22.91	23.52		42.24	13.91	42.24
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.028	0.055		0.050	0.088	0.100

Standard errors, clustered at community level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variables are: community-level self-assessed religiosity, community-level religious practice, and more than 75 percent village population participation in religious practice. Control variables: wife's age, wife's age^2, wife's years of education, religion is Islam, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table B29: *OLS Estimation of the Impact of Religiosity on Women's Decision-making Power (only for Muslims)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
IFLS 2007						
Religiosity (self-assessment)	-0.013	0.003	0.000	-0.003	-0.021**	0.008
	(0.049)	(0.013)	(0.031)	(0.016)	(0.009)	(0.006)
Observations	4748	4472	4748	4748	4748	3915
Adjusted R^2	0.029	0.006	0.018	0.017	0.025	0.007
Religiosity (religious practice)	-0.079	-0.016	0.011	-0.051***	-0.027**	0.005
	(0.052)	(0.011)	(0.039)	(0.017)	(0.011)	(0.009)
Observations	4484	4234	4484	4484	4484	3696
Adjusted R^2	0.027	0.006	0.016	0.017	0.027	0.007
IFLS 2014						
Religiosity (self-assessment)	-0.184***	-0.044***	-0.088***	-0.036	-0.005	-0.013
	(0.060)	(0.017)	(0.027)	(0.024)	(0.012)	(0.008)
Observations	5789	5437	5789	5789	5789	5285
Adjusted R^2	0.053	0.021	0.031	0.039	0.039	0.014
Religiosity (religious practice)	-0.099	-0.046***	-0.034	0.034	-0.028**	-0.031***
	(0.068)	(0.017)	(0.033)	(0.028)	(0.013)	(0.009)
Observations	5520	5192	5520	5520	5520	5039
Adjusted R^2	0.053	0.021	0.029	0.040	0.042	0.017

Standard errors, clustered at community level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Control variables: wife's age, wife's age^2, wife's years of education, religion is Islam, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table B30: *Fixed-effect Estimation of Religiosity on Women's Decision-making Power (only for Muslims)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
Religiosity (self-assessment)	-0.075	-0.022	-0.024	-0.007	-0.020*	-0.003
	(0.055)	(0.016)	(0.031)	(0.022)	(0.012)	(0.008)
Observations	11223	10770	11223	11223	11223	9901
Adjusted R^2	0.130	0.146	0.104	0.060	0.033	0.022
F-stat	38.394	42.289	27.585	18.439	9.331	5.580
Religiosity (religious practice)	-0.018	0.005	0.027	-0.011	-0.026*	-0.009
	(0.069)	(0.019)	(0.038)	(0.028)	(0.015)	(0.011)
Observations	10715	10295	10715	10715	10715	9457
Adjusted R^2	0.131	0.145	0.106	0.059	0.032	0.021
F-stat	37.273	40.222	26.941	16.085	9.463	4.911

Standard errors, clustered at community level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Control variables: wife's age, wife's age^2, wife's years of education, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, urban, and Java

Table B31: *IV Estimation of the Impact of Religiosity on Women's Decision-making Power (only for Muslims)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
IFLS 2007						
Religiosity	-0.272	-0.066	-0.086	-0.050	-0.070	0.010
(self-assessment)	(0.337)	(0.085)	(0.244)	(0.095)	(0.063)	(0.058)
Observations	4617	4352	4617	4617	4617	3803
Adjusted R^2	0.022	-0.004	0.017	0.014	0.018	0.007
First stage F-stat	17.81	13.71	17.81	17.81	17.81	15.13
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.211	0.639	0.197	0.227	0.453	0.211
Religiosity	-0.678**	-0.088	-0.329	-0.186***	-0.014	-0.066
(religious practice)	(0.282)	(0.061)	(0.201)	(0.071)	(0.043)	(0.041)
Observations	4363	4124	4363	4363	4363	3592
Adjusted R^2	-0.005	-0.002	-0.005	0.001	0.027	-0.015
First stage F-stat	26.82	26.75	16.34	16.34	16.34	12.56
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.211	0.639	0.060	0.019	0.743	0.141
IFLS 2014						
Religiosity	-1.546***	-0.475***	-0.799***	-0.128	-0.086	-0.106**
(self-assessment)	(0.446)	(0.118)	(0.242)	(0.141)	(0.077)	(0.044)
Observations	4640	4406	4640	4640	4640	4234
Adjusted R^2	-0.057	-0.126	-0.096	0.032	0.032	-0.018
First stage F-stat	24.80	20.02	24.798	24.80	24.80	20.89
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.022	0.293	0.055	0.020	0.743	0.141
Religiosity	-1.207***	-0.339***	-0.541***	-0.173	-0.085	-0.093***
(religious practice)	(0.309)	(0.077)	(0.165)	(0.106)	(0.058)	(0.035)
Observations	4449	4235	4449	4449	4449	4059
Adjusted R^2	-0.009	-0.036	-0.024	0.024	0.037	0.006
First stage F-stat	24.95	24.70	26.82	26.82	26.82	26.01
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.588	0.419	0.197	0.227	0.453	0.211

Standard errors, clustered at community level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variables are: community-level self-assessed religiosity, community-level religious practice, and more than 75 percent village population participation in religious practice.
Control variables: wife's age, wife's age^2, wife's years of education, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size, number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table B32: *OLS Estimation of the Impact of Religiosity on Indirect Proxy of Women's Autonomy (only for Muslims)*

	Currently use birth control	Number of *arisan* groups joined	Number of *arisan meetings* attended last year	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
IFLS 2007						
Religiosity (self-assessment)	0.008	0.029^{*}	0.982^{***}	-0.262	-0.560	0.011
	(0.008)	(0.015)	(0.304)	(0.259)	(0.579)	(0.009)
Observations	4005	4749	4749	4701	3483	4749
Adjusted R^2	0.065	0.152	0.075	0.033	0.047	0.078
Religiosity (religious practice)	-0.006	0.053^{***}	0.957^{***}	0.235	1.556^{***}	-0.001
	(0.010)	(0.020)	(0.354)	(0.299)	(0.549)	(0.010)
Observations	3752	4485	4485	4445	3341	4485
Adjusted R^2	0.064	0.154	0.074	0.037	0.053	0.077
IFLS 2014						
Religiosity (self-assessment)	0.001	-0.007	N/A	-0.196	-0.511	0.010
	(0.007)	(0.018)		(0.339)	(0.683)	(0.007)
Observations	4749	3061		5770	4232	5789
Adjusted R^2	0.080	0.076		0.058	0.072	0.070
Religiosity (religious practice)	-0.013	0.041^{*}	N/A	-0.354	-0.183	-0.005
	(0.010)	(0.024)		(0.349)	(0.648)	(0.009)
Observations	4504	2949		5503	4091	5520
Adjusted R^2	0.081	0.075		0.060	0.074	0.065

Standard errors, clustered at community level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Control variables: wife's age, wife's age^2, wife's years of education, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table B33: *Fixed-effect Estimation of the Impact of Religiosity on Indirect Proxy of Women's Autonomy (only for Muslims)*

	Currently use birth control	Number of *arisan* groups joined	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
Religiosity (self-assessment)	-0.014	0.013	0.384	0.206	0.001
	(0.008)	(0.019)	(0.328)	(0.601)	(0.007)
Observations	9461	8940	11170	8552	11224
Adjusted R^2	0.070	0.328	0.012	0.006	0.067
F-stat	19.234	69.717	3.718	1.578	21.938
Religiosity (religious practice)	-0.010	0.028	-0.436	0.817	0.007
	(0.011)	(0.023)	(0.432)	(0.684)	(0.009)
Observations	8984	8521	10669	8263	10716
Adjusted R^2	0.072	0.328	0.015	0.007	0.067
F-stat	18.829	64.744	3.767	1.611	19.837

Standard errors, clustered at community level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Control variables: wife's age, wife's age^2, wife's years of education, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, urban, and Java

Table B34: *IV Estimation of the Impact of Religiosity on Indirect Proxy of Women's Autonomy (only for Muslims)*

	Currently use birth control	Number of *arisan* groups joined	Number of *arisan meetings* attended last year	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
IFLS 2007						
Religiosity	-0.098	0.287^{*}	5.181	-1.365	-5.295^{*}	0.069
(self-assessment)	(0.062)	(0.150)	(3.221)	(1.639)	(2.981)	(0.069)
Observations	3890	4618	4618	4572	3393	4618
Adjusted R^2	0.025	0.093	0.037	0.029	0.020	0.069
First stage F-stat	16.19	24.83	24.83	25.65	17.33	24.83
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.037	0.886	0.564	0.823	0.836	0.154
Religiosity	-0.162^{***}	0.163	1.656	-1.046	-3.257	0.044
(religious practice)	(0.055)	(0.113)	(2.188)	(1.364)	(2.594)	(0.055)
Observations	3647	4364	4364	4325	3253	4364
Adjusted R^2	0.011	0.149	0.075	0.033	0.027	0.072
First stage F-stat	15.07	26.80	26.80	27.29	33.18	26.80
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.381	0.686	0.347	0.918	0.484	0.116
IFLS 2014						
Religiosity	0.045	0.346^{**}	N/A	-6.405^{***}	-12.091^{***}	0.048
(self-assessment)	(0.047)	(0.145)		(2.417)	(4.331)	(0.065)
Observations	3651	2500		4627	3549	4640
Adjusted R^2	0.065	-0.009		-0.010	-0.018	0.059
First stage F-stat	19.51	21.62		28.86	27.57	28.28
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.680	0.092		0.181	0.651	0.071
Religiosity	0.034	0.050	N/A	-4.765^{**}	-8.071^{**}	-0.013
(religious practice)	(0.041)	(0.104)		(1.917)	(3.154)	(0.048)
Observations	3482	2418		4438	3444	4449
Adjusted R^2	0.067	0.083		0.034	0.035	0.058
First stage F-stat	23.04	27.69		42.66	40.93	42.61
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.629	0.023		0.160	0.433	0.068

Standard errors, clustered at community level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variables are: community-level self-assessed religiosity, community-level religious practice, and more than 75 percent village population participation in religious practice. Control variables: wife's age, wife's age^2, wife's years of education, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table B35: *OLS Estimation of the Impact of Religiosity on Women's Decision-making Power (Weighed)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
IFLS 2007						
Religiosity (self-assessment)	-0.022	0.003	-0.015	-0.001	-0.018*	0.011
	(0.047)	(0.012)	(0.029)	(0.016)	(0.010)	(0.006)
Observations	4417	4141	4417	4417	4417	3788
Adjusted R^2	0.036	0.007	0.032	0.014	0.025	0.009
Religiosity (religious practice)	-0.068	-0.008	0.006	-0.052***	-0.025**	0.012
	(0.053)	(0.012)	(0.039)	(0.016)	(0.011)	(0.009)
Observations	4170	3919	4170	4170	4170	3582
Adjusted R^2	0.033	0.006	0.029	0.015	0.027	0.009
IFLS 2014						
Religiosity (self-assessment)	-0.188***	-0.046***	-0.100***	-0.040*	0.002	-0.008
	(0.057)	(0.016)	(0.027)	(0.024)	(0.013)	(0.008)
Observations	5239	4881	5239	5239	5239	4872
Adjusted R^2	0.054	0.027	0.047	0.027	0.027	0.011
Religiosity (religious practice)	-0.103	-0.045**	-0.047	0.031	-0.023*	-0.024**
	(0.067)	(0.019)	(0.034)	(0.026)	(0.013)	(0.009)
Observations	4996	4659	4996	4996	4996	4646
Adjusted R^2	0.054	0.027	0.045	0.027	0.030	0.013

Standard errors, clustered at community level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Control variables: wife's age, wife's age^2, wife's years of education, religion is Islam, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size, number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table B36: *Fixed-effect Estimation of the Impact of Religiosity on Women's Decision-making Power (Weighed)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
PANEL estimations						
Religiosity (self-assessment)	-0.043	-0.009	-0.019	-0.003	-0.012	0.003
	(0.057)	(0.017)	(0.032)	(0.023)	(0.013)	(0.009)
Observations	10417	9970	10417	10417	10417	9409
Adjusted R^2	0.140	0.152	0.133	0.045	0.039	0.024
F-stat	34.984	35.543	30.843	12.729	8.720	5.597
Religiosity (religious practice)	-0.011	0.019	-0.001	0.016	-0.029*	-0.011
	(0.069)	(0.020)	(0.041)	(0.028)	(0.016)	(0.012)
Observations	9947	9529	9947	9947	9947	8993
Adjusted R^2	0.141	0.150	0.136	0.045	0.039	0.023
F-stat	34.016	31.592	30.597	11.181	9.108	4.762

Standard errors, clustered at community level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Control variables: wife's age, wife's age^2, wife's years of education, religion is Islam, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size, number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, urban, and Java

Table B37: *IV Estimation of the Impact of Religiosity on Women's Decision-making Power (Weighed)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
IFLS 2007						
Religiosity	-0.192	-0.026	-0.040	-0.071	-0.065	0.027
(self-assessment)	(0.373)	(0.099)	(0.262)	(0.103)	(0.075)	(0.067)
Observations	4284	4018	4284	4284	4284	3673
Adjusted R^2	0.032	0.004	0.033	0.006	0.019	0.008
First stage F-stat	16.65	13.19	16.65	16.55	16.65	13.45
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.026	0.511	0.024	0.040	0.779	0.569
Religiosity	-0.834**	-0.088	-0.426*	-0.261***	-0.012	-0.045
(religious practice)	(0.348)	(0.089)	(0.218)	(0.089)	(0.054)	(0.050)
Observations	4046	3805	4046	4046	4046	3474
Adjusted R^2	-0.024	-0.005	-0.007	-0.026	0.028	-0.004
First stage F-stat	25.57	24.30	25.57	25.57	25.57	25.81
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.050	0.031	0.004	0.784	0.328	0.900
IFLS 2014						
Religiosity	-1.832***	-0.482***	-1.058***	-0.137	-0.115	-0.096*
(self-assessment)	(0.508)	(0.136)	(0.274)	(0.157)	(0.089)	(0.051)
Observations	4042	3811	4042	4042	4042	3781
Adjusted R^2	-0.121	-0.140	-0.187	0.020	0.006	-0.020
First stage F-stat	19.79	18.73	19.79	19.79	19.79	20.05
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.850	0.718	0.998	0.568	0.412	0.208
Religiosity	-1.333***	-0.343***	-0.706***	-0.180	-0.056	-0.086**
(religious practice)	(0.372)	(0.101)	(0.196)	(0.123)	(0.066)	(0.043)
Observations	3874	3660	3874	3874	3874	3623
Adjusted R^2	-0.019	-0.032	-0.030	0.012	0.026	0.001
First stage F-stat	22.86	23.76	22.86	22.86	22.86	21.96
$\tilde{\chi}^2$ *P-val*						
(Overidentification test)	0.300	0.350	0.070	0.799	0.203	0.592

Standard errors, clustered at community level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variables are: community-level self-assessed religiosity, community-level religious practice, and more than 75 percent village population participation in religious practice.
Control variables: wife's age, wife's age^2, wife's years of education, religion is Islam, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table B38: *OLS Estimation of the Impact of Religiosity on Women's Decision-making Power (only for Muslims & Weighed)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
IFLS 2007						
Religiosity	-0.018	0.005	-0.011	0.001	-0.023**	0.011*
(self-assessment)	(0.051)	(0.013)	(0.031)	(0.017)	(0.010)	(0.007)
Observations	4005	3746	4005	4005	4005	3441
Adjusted R^2	0.035	0.004	0.029	0.014	0.025	0.008
Religiosity	-0.040	-0.006	0.026	-0.046***	-0.027**	0.016
(religious practice)	(0.052)	(0.013)	(0.041)	(0.017)	(0.013)	(0.010)
Observations	3752	3518	3752	3752	3752	3229
Adjusted R^2	0.031	0.003	0.026	0.014	0.027	0.008
IFLS 2014						
Religiosity	-0.169***	-0.045***	-0.089***	-0.031	0.004	-0.009
(self-assessment)	(0.059)	(0.017)	(0.028)	(0.025)	(0.014)	(0.008)
Observations	4755	4429	4755	4755	4755	4452
Adjusted R^2	0.053	0.026	0.043	0.026	0.025	0.010
Religiosity	-0.171**	-0.064***	-0.076**	0.022	-0.028*	-0.029***
(religious practice)	(0.074)	(0.020)	(0.037)	(0.029)	(0.015)	(0.010)
Observations	4510	4205	4510	4510	4510	4224
Adjusted R^2	0.054	0.027	0.042	0.026	0.028	0.013

Standard errors, clustered at community level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Control variables: wife's age, wife's age^2, wife's years of education, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table B39: Fixed-effect Estimation of the Impact of Religiosity on Women's Decision-making Power (only for Muslims & Weighed)

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
PANEL estimations						
Religiosity	-0.017	-0.005	-0.012	0.011	-0.011	0.001
(self-assessment)	(0.059)	(0.017)	(0.033)	(0.023)	(0.014)	(0.009)
Observations	9467	9055	9467	9467	9467	8592
Adjusted R^2	0.143	0.165	0.133	0.048	0.039	0.024
F-stat	35.852	38.732	30.927	13.511	8.702	5.491
Religiosity	-0.031	0.011	-0.002	0.010	-0.033*	-0.013
(religious practice)	(0.075)	(0.022)	(0.044)	(0.031)	(0.018)	(0.013)
Observations	8990	8607	8990	8990	8990	8169
Adjusted R^2	0.145	0.164	0.137	0.047	0.040	0.023
F-stat	35.145	35.967	29.653	11.595	8.970	4.692

Standard errors, clustered at community level, in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Control variables: wife's age, wife's age^2, wife's years of education, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, urban, and Java

Table B40: *IV Estimation of the Impact of Religiosity on Women's Decision-making Power (only for Muslims & Weighed)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
IFLS 2007						
Religiosity (self-assessment)	-0.183	-0.023	-0.063	-0.070	-0.040	0.035
	(0.385)	(0.106)	(0.276)	(0.104)	(0.079)	(0.068)
Observations	3889	3640	3889	3889	3889	3338
Adjusted R^2	0.031	0.002	0.029	0.006	0.025	0.006
First stage F-stat	16.17	12.58	16.17	16.17	16.17	13.60
$\tilde{\chi}^2$ *P-val* *(Overidentification test)*	0.053	0.612	0.060	0.063	0.306	0.446
Religiosity (religious practice)	-0.600*	-0.052	-0.331	-0.198**	0.029	-0.039
	(0.336)	(0.088)	(0.235)	(0.085)	(0.060)	(0.050)
Observations	3646	3422	3646	3646	3646	3134
Adjusted R^2	0.003	-0.001	0.002	-0.007	0.022	-0.004
First stage F-stat	15.08	14.73	15.08	15.08	15.08	16.58
$\tilde{\chi}^2$ *P-val* *(Overidentification test)*	0.208	0.850	0.221	0.276	0.379	0.330
IFLS 2014						
Religiosity (self-assessment)	-1.642***	-0.464***	-0.935***	-0.091	-0.068	-0.124**
	(0.497)	(0.138)	(0.269)	(0.155)	(0.085)	(0.051)
Observations	3655	3445	3655	3655	3655	3443
Adjusted R^2	-0.091	-0.130	-0.144	0.021	0.016	-0.042
First stage F-stat	19.47	18.38	19.47	19.47	19.47	19.87
$\tilde{\chi}^2$ *P-val* *(Overidentification test)*	0.838	0.772	0.976	0.474	0.861	0.884
Religiosity (religious practice)	-1.388***	-0.366***	-0.738***	-0.160	-0.056	-0.093**
	(0.393)	(0.107)	(0.203)	(0.131)	(0.072)	(0.046)
Observations	3486	3293	3486	3486	3486	3284
Adjusted R^2	-0.018	-0.034	-0.037	0.014	0.024	0.000
First stage F-stat	23.00	23.55	23.00	23.00	23.00	22.05
$\tilde{\chi}^2$ *P-val* *(Overidentification test)*	0.840	0.746	0.402	0.637	0.725	0.820

Standard errors, clustered at community level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variables are: community-level self-assessed religiosity, community-level religious practice, and more than 75 percent village population participation in religious practice.
Control variables: wife's age, wife's age^2, wife's years of education, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size, number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table B41: *IV Estimation of the Impact of Religiosity on Women's Decision-making Power (using only one IV)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
IFLS 2007						
Religiosity	-2.837*	-0.337	-1.617*	-0.748*	-0.005	-0.136
(self-assessment)	(1.563)	(0.311)	(0.905)	(0.402)	(0.157)	(0.162)
Observations	4416	4140	4416	4416	4416	3787
Adjusted R^2	-1.025	-0.240	-0.695	-0.670	0.025	-0.117
First stage F-stat	8.38	8.89	8.38	8.38	8.38	7.66
Religiosity	-1.132***	-0.131	-0.620**	-0.313***	-0.004	-0.072
(religious practice)	(0.383)	(0.098)	(0.250)	(0.096)	(0.059)	(0.053)
Observations	4169	3918	4169	4169	4169	3581
Adjusted R^2	-0.073	-0.014	-0.053	-0.039	0.027	-0.019
First stage F-stat	41.68	39.67	41.68	41.68	41.68	45.52
IFLS 2014						
Religiosity	-1.922**	-0.515**	-0.705*	-0.382	-0.058	-0.277***
(self-assessment)	(0.789)	(0.216)	(0.397)	(0.268)	(0.120)	(0.088)
Observations	4742	4451	4742	4742	4742	4423
Adjusted R^2	-0.140	-0.160	-0.057	-0.019	0.019	-0.276
First stage F-stat	23.59	22.36	23.59	23.59	23.59	25.41
Religiosity	-1.079***	-0.281**	-0.407*	-0.228	-0.025	-0.156***
(religious practice)	(0.414)	(0.110)	(0.218)	(0.148)	(0.069)	(0.051)
Observations	4525	4253	4525	4525	4525	4221
Adjusted R^2	0.008	-0.007	0.013	0.009	0.026	-0.033
First stage F-stat	50.93	51.91	50.93	50.93	50.93	50.85

Standard errors, clustered at community level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variable is: community-level religious practice.
Control variables: wife's age, wife's age^2, wife's years of education, religion is Islam, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size, number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table B42: *IV Estimation of the Impact of Religiosity on Indirect Proxy (using only one IV)*

	Currently use birth control	Number of *arisan* groups joined	Number of *arisan meetings* attended last year	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
IFLS 2007						
Religiosity (self-assessment)	-0.414**	0.337	0.447	-3.506	-15.368	0.114
	(0.189)	(0.343)	(6.866)	(4.826)	(11.515)	(0.163)
Observations	4412	4417	4417	4366	3038	4417
Adjusted R^2	-0.539	0.046	0.077	0.003	-0.179	0.045
First stage F-stat	8.41	8.40	8.40	9.50	7.75	8.40
Religiosity (religious practice)	-0.165***	0.100	-0.480	-1.339	-6.344*	0.039
	(0.058)	(0.132)	(2.644)	(1.827)	(3.733)	(0.062)
Observations	4165	4170	4170	4126	2909	4170
Adjusted R^2	0.001	0.144	0.076	0.034	0.012	0.076
First stage F-stat	41.31	41.68	41.68	43.04	48.22	41.68
IFLS 2014						
Religiosity (self-assessment)	0.036	-0.166	N/A	-7.274*	-14.810**	0.102
	(0.080)	(0.267)		(4.075)	(6.311)	(0.111)
Observations	4737	2461		4722	3298	4742
Adjusted R^2	0.070	0.043		-0.026	-0.046	0.045
First stage F-stat	23.55	18.74		24.03	23.79	23.59
Religiosity (religious practice)	0.022	-0.103	N/A	-4.235*	-7.650**	0.037
	(0.045)	(0.143)		(2.262)	(3.736)	(0.062)
Observations	4520	2371		4507	3191	4525
Adjusted R^2	0.072	0.053		0.040	0.045	0.068
First stage F-stat	50.96	35.75		50.86	49.72	50.93

Standard errors, clustered at community level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variable is: community-level religious practice.
Control variables: wife's age, wife's age^2, wife's years of education, religion is Islam, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table B43: *IV Estimation of the Impact of Religiosity on Women's Decision-making Power (using only one IV and Muslims population)*

	Aggregate measure	Child-related decisions	Routine household decisions	Non-routine household decisions	Time use decisions	Fertility decisions
IFLS 2007						
Religiosity	-1.552*	-0.146	-0.974*	-0.402*	0.066	-0.085
(self-assessment)	(0.847)	(0.201)	(0.565)	(0.213)	(0.127)	(0.114)
Observations	3994	3736	3994	3994	3994	3431
Adjusted R^2	-0.287	-0.046	-0.246	-0.183	0.000	-0.046
First stage F-stat	13.42	14.32	13.42	13.42	13.42	13.14
Religiosity	-0.848**	-0.076	-0.501*	-0.236**	0.037	-0.070
(religious practice)	(0.372)	(0.096)	(0.267)	(0.092)	(0.065)	(0.053)
Observations	3743	3510	3743	3743	3743	3220
Adjusted R^2	-0.029	-0.002	-0.034	-0.012	0.019	-0.018
First stage F-stat	37.50	32.75	37.50	37.50	37.50	40.48
IFLS 2014						
Religiosity	-1.634**	-0.502***	-0.603*	-0.264	-0.037	-0.234***
(self-assessment)	(0.685)	(0.190)	(0.349)	(0.237)	(0.110)	(0.078)
Observations	4280	4016	4280	4280	4280	4019
Adjusted R^2	-0.090	-0.152	-0.036	0.004	0.019	-0.191
First stage F-stat	28.15	27.62	63.81	28.15	28.15	29.23
Religiosity	-1.104**	-0.334***	-0.416*	-0.198	-0.011	-0.150***
(religious practice)	(0.437)	(0.117)	(0.230)	(0.159)	(0.077)	(0.053)
Observations	4063	3818	4063	4063	4063	3817
Adjusted R^2	0.012	-0.016	0.011	0.014	0.024	-0.024
First stage F-stat	52.48	51.93	52.48	52.48	52.48	51.13

Standard errors, clustered at community level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variable is: community-level religious practice.
Control variables: wife's age, wife's age^2, wife's years of education, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size, number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java

Table B44: *IV Estimation of the Impact of Religiosity on Women's Indirect Proxy (using only one IV and Muslims population)*

	Currently use birth control	Number of *arisan* groups joined	Number of *arisan meetings* attended last year	Wife's shares of *all* household assets	Wife's shares of *non-liquid* household assets	Currently employed
IFLS 2007						
Religiosity (self-assessment)	-0.355**	0.236	-0.962	-3.589	-13.396	0.045
	(0.143)	(0.273)	(5.647)	(3.977)	(8.404)	(0.131)
Observations	3993	3995	3995	3949	2768	3995
Adjusted R^2	-0.381	0.097	0.064	-0.002	-0.130	0.067
First stage F-stat	13.43	13.45	13.45	15.22	13.98	13.45
Religiosity (religious practice)	-0.192***	0.092	-1.152	-1.375	-7.316*	0.027
	(0.062)	(0.144)	(2.916)	(2.015)	(3.934)	(0.068)
Observations	3742	3744	3744	3705	2636	3744
Adjusted R^2	-0.007	0.141	0.066	0.034	-0.012	0.068
First stage F-stat	37.51	37.50	37.50	38.96	43.85	37.50
IFLS 2014						
Religiosity (self-assessment)	0.040	-0.110	N/A	-5.929	-13.479**	0.059
	(0.071)	(0.223)		(3.616)	(5.489)	(0.090)
Observations	4275	2277		4262	2983	4280
Adjusted R^2	0.069	0.063		-0.006	-0.038	0.058
First stage F-stat	52.52	43.65		52.55	53.04	52.48
Religiosity (religious practice)	0.027	-0.078	N/A	-4.144*	-8.497**	0.021
	(0.049)	(0.153)		(2.471)	(4.058)	(0.063)
Observations	4058	2186		4047	2876	4063
Adjusted R^2	0.072	0.063		0.038	0.034	0.058
First stage F-stat	25.871	8.131		12.156	15.995	14.389

Standard errors, clustered at community level, in parentheses;
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The instrumental variable is: community-level religious practice.
Control variables: wife's age, wife's age^2, wife's years of education, ratio of wife's age to husband's, ratio of wife's years of education to husband's, husband is employed, household size number of children in household, nominal log per-capita expenditure, live with wife's parents, live with husband's parents, ambilocal kinship norms, patrilocal kinship norms, urban, and Java